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CONTENTS

Editorial 265
Papers:
The Types of Bacillus Bovisepticus Encountered in a Dairy Herd—F. S. Jones 271
Clinical Aids in the Differential Diagnosis of the Common Poultry Diseases—F. R. Beaudette 283
The Hydrogen Ion Concentration of Horse Semen—W. S. Anderson, A. M. Peter and D. J. Healy 291
Field Observations in Loco Poisoning—O. E. Troy 299
The Need of Cooperation Between the United States and Mexico for the Control of Epizootics—L. Santa Maria 306
Cooperation in the Eradication of Tuberculosis—H. R. Smith 310
The Veterinarian and the Public—A. N. Carroll 315
Municipal Food Inspection—George H. Glover 317
Clinical and Case Reports:
Anthrax in Two Dogs, Treated with Serum—Charles V. Noback 322
Some Parasites Found in Sheep on the Sabana of Bogota—Charles V. Noback 325
Granuloma of the Frog in the Horse—Ernest F. Jardine 328
Intussusception in a Colt—C. A. Cary 329
Abstracts 330
Reviews 337
Army Veterinary Service 340
Association News:
Proceedings of the Fifty-eighth Annual Meeting, A. V. M. A 349
Other Meetings 374
Communications 379
Necrology 386
Miscellaneous:
Dr. Duncan McEachran an Honored Guest 388
An Endurance Test for Horses 392
A Mountain Trip—N. S. Mayo 393

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THE VETERINARIAN AND ANIMAL EXPERIMENTATION

AT THE Denver meeting of the American Veterinary Medical Association, a resolution urging the necessity and desirability of animal experimentation was unanimously adopted. This action of the Association accurately reflects the sentiment of the veterinary profession, as veterinarians are thoroughly familiar with the benefits of such experimentation and the advantages accruing to their patients from the research work carried out on ownerless dogs and cats and on horses which have outlived their usefulness. There is no question in our profession as to whether it is better to use these animals to add to our knowledge and our ability to save our clients' animal friends and servants or to kill these useless animals and lose the knowledge and proficiency that we might derive from their use in experiments. Non-medical men and a very small minority of medical men may argue that the knowledge derived from animal experimentation can not be applied in the field of human medicine; veterinarians know that such knowledge is immediately applicable to animal patients in much greater numbers and of far more value from a sentimental or economic standpoint than the animals used in the experiments.

But it is not sufficient that the veterinarian should know this. He should also know that attacks on such experiments are constantly being made by persons with little or no accurate knowledge of animal experimentation. The aim of such persons is usually to put animal experimentation on a basis of regulation under the direction and supervision of individuals untrained in science, to follow this entering wedge by prohibiting the use of dogs in such experiments, and finally to prohibit entirely all animal experimentation. Propaganda toward this end is being constantly carried on in this country and other countries. In England hampering regulations have been enacted to the detriment of biological research. In this country regulation has several times been introduced into Congress and some of the State Legislatures. Such regulatory legislation was before Congress last year and was defeated. It was before the California Legislature last year and was defeated on a referendum to the people. It will doubtless be introduced in several places this year and it is essential that the veterinarian take his share in repelling attacks of this sort on research. He is as well informed as persons in any profession or occupation in regard to the desirability of continued experimental research, and better informed than most persons. He realizes, as most persons can not, that individuals without scientific medical or veterinary training are as incompetent to judge the necessity for animal experimentation and the mode of conducting it as persons untrained in chemistry are to supervise chemical research or persons untrained in law are to pass on nice legal distinctions.

Since the veterinarian is the one most competent to supervise such research along veterinary lines, it is important that he exercise this supervision to its full extent and that he take all steps necessary to show that it is being exercised wisely. We are well aware that animals in veterinary colleges and laboratories are handled in a kindly manner and with consideration for their well-being and comfort. But we should emphasize the need for such consideration in dealing with students and place ourselves on record before the world at large in our laboratories and colleges in regard to our attitude in this matter. To this end there is posted in many medical schools and laboratories a set of regulations in regard to handling animals, and these regulations serve as a constant reminder to the student and also afford visible evidence to the public of the nature of the supervision which

we exercise over our animals. A set of regulations, somewhat modified from the medical regulations, is posted in the animal room of the Bureau of Animal Industry and in the Bureau laboratories where animal experiments are conducted. We strongly urge that the other veterinary laboratories and the veterinary colleges keep these rules or a similar set conspicuously posted, regardless of the fact that their present practice is already in accord with them. These regulations are as follows:

"Experiments on animals will be carried on in the Bureau of Animal Industry subject to the following set of rules, copies of which will be kept posted in the animal room and in all laboratories of this Bureau where such experiments are conducted:

"I. Dogs and cats intended for use as experiment animals shall only be purchased or accepted from the city pound of Washington or pounds of other cities or from the owners of the animals when satisfactory proof of the legal right of such persons to dispose of such animals is shown.

"II. Animals in the laboratory shall receive every consideration for their bodily comfort; they shall be treated kindly, fed properly, and their surroundings kept in the best possible sanitary condition.

"III. No experiments on animals shall be made except with the sanction of the Chief of this Bureau or the Chief of the Division in which the experiment is carried on, the one approving the experiment to hold himself responsible for the importance of the experiment and the propriety of the experimental procedure.

"IV. In any operation likely to cause greater discomfort than that attending anesthetization, the animal shall first be rendered incapable of feeling pain and shall be maintained in that condition until the operation is ended.

"Exceptions to this rule may be made by the Chief of Bureau or the Chief of the Division in which the experiment is carried on, but only when anesthesia would defeat the object of the experiment. In such cases an anesthetic shall be used so far as possible and may be discontinued only so long as is absolutely essential for the necessary observations.

"V. At the conclusion of the experiment the animal shall be killed painlessly.

"Exceptions to this rule will be made only when continuance of the animal's life is necessary to determine the result of the

experiment. In that case, the same aseptic precautions shall be observed during the operation and the same care shall be taken to minimize discomforts during the convalescence as in a hospital for human beings."

ANTIVIVISECTION ANTICS

AN ARTICLE on "The Truth About Vivisection" by Ernest Harold Baynes in *The Woman's Home Companion* has aroused the ire of the antivivisectionists and has provoked a characteristic exhibition of their methods. Mr. Baynes, who is a leading naturalist and animal lover, after a long and painstaking investigation concluded that the whole case of the antivivisectionists is without any sound basis of fact, and showed that their literature is a tissue of misrepresentations and garbled and obsolete authorities. He found, for instance, that one Dr. John Elliotson, quoted by them as a physician "of the highest intelligence," was a mesmerist, born 130 years ago.

Instead of attempting to reply squarely to the very definite statements made in Mr. Baynes' article, the New York Antivivisection Society has issued a circular letter "to all friends of animals" calling on them to write to the *Companion* "excoriating this nonsensical article" and "telling the editors that not only have you bought your last number, but that you will enter upon a personal campaign to urge others to withdraw all support in future."

Evidently the antis do not relish having their methods shown up. It is more in line with their principles to abuse the author and boycott the offending journal than to controvert the article by fair argument and statements of fact. The inference is plain that they are unable to do the latter.

ANNUAL MEETINGS AND THE PRESS

ONE OF the most powerful and immediate acting educational forces of the Nation is the Associated Press. It does more to mold public opinion and shape the destiny of a people, or an organization, than all the combined orators and reformers who ever graced a platform.

If we did not have the advantages of the Associated Press, we would be clamoring for a substitute. Now that it is a tangi-

ble resource and instantly spreads information to the reading public, it is difficult to understand how the A. V. M. A. can indulge in so much enthusiasm and neglect so great an opportunity.

When the meeting was held in New Orleans in 1919, the membership commenced to realize the necessity of a closer and more accurate relationship with the Press, and to a certain extent our ambitions were realized, but we had to be content with a small amount of space, because the paper shortage was at its peak. How the publicity division of the Association has fared since the New Orleans meeting we are unable to discuss, but it is a known fact that the proceedings of the A. V. M. A. are never featured outside of the city where the conventions are being held.

We are climbing the grade toward a goal which we have placed at the very crest; we are striving to show the world the merits of veterinary medicine and the mettle of our personnel, whereby our cause may receive due recognition and, when necessary, be heroically championed in the halls of Congress and the legislative chambers of the States. We will be precluded from accomplishing all of this until better and closer cooperation is established between the profession and the Associated Press.

It is sincerely hoped that when the President of the A. V. M. A. delivers his address either at St. Louis, Missouri, or Madison, Wisconsin, he will incorporate within that manuscript a recommendation for the appointment each year of a publicity committee which will endeavor to eliminate undesirable headlines and furnish sound, sensible and accurate basic material consistent with the dignity of the profession, so that when the convention has closed our achievements and ambitions will have been properly disseminated to the great mass of humanity whom we are serving. E. I. S.

A REMINDER OF THE REAL DANGER OF RABIES

THE well-informed medical man—physician or veterinarian—knows perfectly well that rabies or hydrophobia is a real malady caused by a specific virus and usually transmitted by the bite of an affected dog or other animal. For many years scientific research has left no room for skepticism on this point.

Some doubt still persists among the laity, however, and this is sedulously cultivated by zealous antivivisectionists whose opposition to animal experimentation will not permit them to acknowledge facts developed in that field of research. This skepticism also finds favor with persons who oppose the muzzling of dogs. It is well, therefore, for veterinarians to be posted and to aid in the spread of correct information on the subject of rabies. In recent years the Pasteur treatment has been so generally employed on bitten persons that authentic cases of death from rabies have become relatively rare and the malady has lost some of its terror for the popular mind.

A convicing case of fatal rabies in man in the French African colony of Senegal was recently reported by Teppaz in the *Recueil de Médecine Vétérinaire* (vol. 97, p. 207). Because the disease was practically unknown there, the idea of its nonexistence gained credence among the European population, while the natives were ignorant of any danger. At length a few cases, probably of European origin, were detected in dogs, and a Government veterinarian called attention to the danger and tried to enforce sanitary measures, but his efforts met with disbelief and opposition.

In August, 1920, a European suffering with spasm of the larynx and esophagus was received at a hospital. In a few hours he died in a terrible attack of asphyxia. It developed that he had been bitten on the hand and knee by a stray dog six weeks before. The same dog also bit a dog belonging to him, and the latter dog developed blindness and partial paralysis and was destroyed. The man twice expressed his intention of going to the hospital for antirabic treatment, but each time he was dissuaded by those who argued that rabies was not a reality and that no one had ever seen a case in a European in Senegal. Rabies in the patient was demonstrated clinically, and also experimentally by inoculation of rabbits and guinea-pigs.

Wisconsin Farmer says editorially: "The purebred-sire campaign that is being waged all over the country should be continued with greater vigor than ever, because the present is the most opportune time for men with small herds of beef or dairy cattle or hogs to buy registered sires."

THE TYPES OF BACILLUS BOVISEPTICUS ENCOUNTERED IN A DAIRY HERD [1]

By F. S. JONES

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DURING the past four years a large dairy herd has been under observation by members of the staff of the Department of Animal Pathology of The Rockefeller Institute for Medical Research. Within this time many autopsies have been made on cows and calves. In the later months of 1920 a serious outbreak of pneumonia (1) occurred among cows purchased a short time before. The disease spread to another lot of newly acquired cows and to a few of the native stock. After the outbreak subsided a few sporadic cases appeared in the herd and among the calves. It is of interest to observe that following this outbreak the lungs of a number of cows slaughtered for various reasons showed lesions of chronic pneumonia and purulent bronchiectasis.

The organisms isolated from the acute outbreak in the cows and the sporadic cases in the adults and calves were identical. Although the pneumonia associated with these infections was severe, the virus was confined to the lungs and pleural cavity. Blood cultures during life and inoculations from the kidney and spleen at autopsy remained sterile. It was possible to obtain *Bacillus bovisepticus* in pure cultures from the lungs in every instance. Morphologically these organisms resembled the strains of *B. bovisepticus* isolated by T. Smith (2) in his studies on calf pneumonia associated with *B. actinoides*. When the complete cultural characters of these two sets of organisms were studied clear-cut differences were noted. Two other cultures in addition to the organisms isolated during the outbreak and from the sporadic cases and those obtained by T. Smith are included in this study. In Table 1 the source of each culture is given. They are arranged in the table according to their cultural grouping, which will be brought out later.

From Table 1 it will be noted that strains 530, 533 and 537 were obtained in pure culture from the lungs and pleural cavi-

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

TABLE 1.—THE SOURCE OF THE STRAINS STUDIED.

Strain number	Date of isolation	Source	Type of disease encountered	Organisms other than *B. bovisepticus.*
530 533 537	Nov. 12, 1920 Nov. 14, 1920 Nov. 19, 1920	Outbreak among cows on near-by farm (A).	Diffuse pneumonia, virus localized within lungs and chest cavity.	None.
550	Dec. 19, 1920	A calf at close of epidemic on Farm A.	Nodular, necrotic pneumonia.	*Staph. albus.*
562	Jan. 26, 1921	Calf, apparently a sporadic infection, Farm A.	Diffuse pneumonia.	None.
578	April 1, 1921	Cow, exposed during outbreak on Farm A.	Nodular, necrotic pneumonia.	None.
583	Mar. 23, 1921	Calf, Farm A.	Apparently umbilical infection, septicemia with pneumonia.	None.
529	Nov. 8, 1920	Calf, farm on Long Island.	Focal consolidation in right caudal lobe; necrotic nodule in left caudal lobe.	Spirillum and spore-bearing bacilli.
6	Jan. 15, 1917	Calf, small outbreak in 1917, Farm A.	Complete consolidation of anterior portion of right cephalic lobe; nodular areas in posterior half: purulent exudate in trachea and bronchus.	None.
209	Mar. 5, 1918	Calf, Farm A.	Diffuse pneumonia.	*B. actinoides.*
432	Oct. 21, 1919	Calf, Farm A.	Diffuse pneumonia.	*B. actinoides, B. pyogenes.*
436	Nov. 4, 1919	Calf, Farm A.	Diffuse pneumonia.	Serum-liquefying organism.
502	May 8, 1920	Calf, lung obtained from abattoir in New York City.	Gray to red consolidation of right cephalic lobe.	None. *B. necrophorus* in liver.
558	Jan. 1, 1921	Calf, Farm A.	Diffuse pneumonia.	*B. actinoides.*
Bov. Pn. I	About 1913	Calf, Massachusetts.	Necrotic pneumonia.	None.
9	Feb. 17, 1917	Calf, Farm A.	Diffuse pneumonia.	*B. actinoides*, cocci.

ties of cows in the small outbreak previously referred to. The first case occurring in a calf (550) was associated with *Staphylococcus albus;* 562 was a pure *bovisepticus* infection; 578 and 583 were cases which occurred in a cow and a calf after the outbreak had subsided. Culture 529 was obtained from a calf on a farm on Long Island. Cultures 6, 209, 432, 436, 502 and 558 were all isolated by Dr. Smith from cases of pneumonia in calves, and in the main they were associated with *Bacillus actinoides.* In most instances *B. actinoides* predominated and is held to be the primary agent. All strains except 558 were isolated before the outbreak occurred in the adult cows. Strain 502 was obtained from the lung of a calf slaughtered in an abattoir in New York. The only available record of culture Pn. I is given in Table 1. Strain 9 was associated with *B. actinoides* and cocci.

The literature concerning the more specific cultural characters and immunological relationship of various types of *Bacillus*

bovisepticus is meager. Many of the observations were made before the various substances used in fermentation tests came into use. Early immunological studies consisted of attempts to protect laboratory animals with immune sera against small doses of virulent culture. T. Smith (3) described certain of the fermentation characters of *B. bovisepticus*. He found that all strains fermented dextrose and saccharose but failed to produce acid in milk or lactose. Some produced indol; others failed to do so. All formed phenol. He recognized the close resemblance existing between *B. bovisepticus* and *B. suisepticus*. Ostertag (4) compared cultures of *B. bovisepticus* with organisms from swine plague and chicken cholera and concluded that his cultures were identical.

Shirop (5) studied three strains of *B. vitulisepticus* isolated from pneumonia of calves. He likewise compared these organisms with cultures of *B. avisepticus* and *B. suisepticus*. It was found that two of the cultures obtained from calves and the swine plague and chicken cholera bacilli possessed similar fermentation characters. They attacked dextrose, saccharose, but did not ferment mannit. The other calf organism attacked only dextrose. All produced indol.

Magnusson (6) records an outbreak of hemorrhagic septicemia among the reindeer in Lapland. He compared the organism isolated from the reindeer with a strain of *B. bovisepticus* and a culture of *B. avisepticus*. He was unable to show cultural differences. All produced acid in lactose, saccharose and mannit, but none fermented maltose.

Besemer's (7) studies of the fermentation characters of ten strains of pasteurella led him to conclude that the members of this group were practically uniform in their biochemical actions. From his tables it will be noted that both strains of *B. bovisepticus* the two cultures of the chicken cholera bacillus, *B. suisepticus*, and three of Magnusson's reindeer pasteurella attacked dextrose, saccharose and mannit, but failed to ferment lactose and maltose. Two of Magnusson's calf pasteurella differed from the others in their ability to ferment lactose.

From the available literature one gains the impression that *B. bovisepticus* and the allied organisms, such as those isolated from calves and reindeer, are a definite type which can not be

differentiated from each other or from other members of the hemorrhagic septicemia group. A careful study of the tables of the various observers indicates that certain differences do exist. The ability of a few of Magnusson's and Besemer's organisms to ferment lactose is indicative of cultural differences. Most of the conclusions were drawn on the study of three or four organisms.

It has been mentioned that all strains referred to in Table 1 resembled each other morphologically. Capsules could be demonstrated for all organisms except strain 9. All were negative to Gram stain. None were motile. It soon became apparent that a study of the fermentation and other characters would aid in separating the organisms into distinct cultural groups. Tubes of fermented bouillon containing 1 per cent of dextrose, lactose, saccharose, maltose, mannit and salicin were used to test acid production. Titrations and hydrogen ion concentrations were determined after 7 days' incubation at 38 degrees C. The results of these and other tests are given in Table 2.

It will be noted that the sixteen strains fall into three groups. Group I is made up of the cultures (530, 533, 537) isolated from the lungs of cows during the outbreak. Strains 550, 562, 578 and 583, obtained from sporadic cases in adults and calves which appeared after the outbreak, also fall into Group I. Culture 529 is identical in all respects with the others. Group 1 organisms then can be characterized as those which ferment dextrose, lactose, saccharose, maltose and mannit. They produce clear zones of hemolysis about the deep colonies in horse blood agar plate cultures. They are not soluble in ox or guinea-pig bile. They do not form indol. In certain instances it seemed doubtful whether lactose had been fermented or not. Subsequent tests in lactose broth showed that the organisms attacked this sugar to about the same degree as the other substances. In no instance was milk coagulated.

The next aggregation comprises six strains (6, 209, 432, 436, 502, 558) all isolated from calves. These organisms ferment dextrose and saccharose, but do not aciduate media containing lactose, maltose, mannit or salicin. Under suitable conditions they produce alkali in media where no fermentation occurs. All produce indol; none are hemolytic. When ox or guinea-pig bile is added to 24-hour bouillon cultures the medium becomes clear.

TABLE 2.—CULTURAL CHARACTERS OF SIXTEEN STRAINS OF BACILLUS BOVISEPTICUS.

Number	Dextrose		Lactose		Saccharose		Maltose		Mannit		Salicin		Indol	Hemolysis	Bile solubility
	Titration	pH	Titration	pH	Titration	pH	Titration	pH	Titration	pH	Titration	pH			
530	2.6	6.2	1.8	6.7	2.7	6.2	2.9	6.2	2.7	6.3	1.2	7.6	−	+	−
533	3.6	6.2	1.7	6.8	3.4	6.3	2.8	6.2	2.6	6.3	1.0	7.5	−	+	−
537	2.7	6.1	1.8	6.7	2.4	6.4	2.7	6.2	2.6	6.2	0.9	7.5	−	+	−
550	3.0	6.1	1.6	6.8	2.4	6.2	2.6	6.3	2.6	6.3	1.0	7.5	−	+	−
562	2.5	6.3	1.9	6.6	2.6	6.3	2.6	6.3	2.5	6.4	0.9	7.5	−	+	−
578	2.8	6.2	2.6	6.4	2.8	6.4	3.1	6.2	2.7	6.3	1.0	7.5	−	+	−
583	2.9	6.1	2.5	6.5	3.3	6.1	3.0	6.3	2.9	6.2	0.9	7.9	−	+	−
529	2.5	6.2	1.7	6.7	2.7	6.4	2.8	6.4	2.5	6.5	1.3	7.3	−	+	−
6	2.5	6.3	0.2	7.9	2.2	6.4	0.6	7.8	0.5	7.9	0.9	7.5	+	−	+
209	2.5	6.3	1.0	7.4	2.6	6.4	1.3	7.6	1.3	7.5	1.4	7.7	+	−	+
432	2.6	6.3	0.6	7.6	2.5	6.4	0.8	7.5	1.0	7.6	1.1	7.4	+	−	+
436	2.4	6.5	0.9	7.5	2.0	6.6	1.0	7.5	1.0	7.5	1.0	7.5	+	−	+
502	2.7	6.1	1.0	7.4	2.7	6.4	1.1	7.5	1.0	7.5	1.0	7.5	+	−	+
558	2.8	6.3	1.0	7.4	2.7	6.2	1.0	7.5	1.0	7.5	1.0	7.4	+	−	+
Bov. Pn. I	2.8	5.9	0.6	7.4	2.7	6.1	0.7	7.5	2.8	6.1	1.2	7.8	+	−	−
9	2.9	5.8	1.0	7.8	2.5	5.9	1.1	7.8	2.5	6.2	0.9	7.5	+	−	−

The two remaining cultures (Bov. Pn. 1 and 9) fall into a distinct group. Media containing dextrose, saccharose and mannit are acidulated. No fermentation occurs in lactose, maltose or salicin broth, although alkali is produced under suitable conditions in such tubes. Both strains form indol. They do not hemolyze horse red blood cells and they are insoluble in bile.

Recently all strains were tested for inulin fermentation. In no instance was acid produced.

Pathogenicity.—The members of Group I are of relatively low virulence for laboratory animals. One-fourth of a cubic centimeter of freshly isolated 24-hour bouillon cultures when injected beneath the skin of rabbits produced only mild local reactions. A calf injected in the subcutis with the pleural exudate from a cow dying of pneumonia developed only a slight local reaction. Intratracheal injection of a calf with 10 c.c. of bouillon culture failed to cause marked disturbances. Group II cultures are slightly more virulent for mice and rabbits. One-fourth of a cubic centimeter of a 24-hour bouillon culture injected beneath the skin of a rabbit usually causes a marked local inflammation which may be absorbed or may terminate in an abscess. Culture Bov. Pn. I of Group III, although under cultivation since 1913, is still virulent. Rabbits die within three or four days when injected subcutaneously.

Reference has been made to earlier attempts to determine immunological relationship between various members of the pasteurella group by means of various protection tests. The agglutination test has in recent years become well recognized as a method of grouping organisms. Accounts of its use in separating the pasteurella have not been met with. Magnusson repeatedly injected a sheep with a culture of the reindeer organism but was unable to demonstrate agglutinins. Shirop makes no mention of agglutinins in the blood of rabbits immunized with *Bacillus vitulisepticus*. Hadley (8) succeeded in producing a serum by injecting a rabbit with *B. avisepticus*. The serum agglutinated the homologous culture at a dilution of 1 : 160.

It was decided to attempt to group the organisms serologically by means of their agglutination affinities. Rabbits were immunized with a single strain chosen from each group. It

TABLE 3.—RESULTS OF AGGLUTINATION TESTS OF ALL STRAINS AGAINST CULTURAL GROUP SERA.

Cultures	Rabbit immunized with Group I Culture 530						Rabbit immunized with Group II Culture 432						Rabbit immunized with Group III Culture Bov. Pn.I.						
	Serum dilutions						Serum dilutions						Serum dilutions						
	1:10	1:20	1:50	1:100	1:200	1:500	1:10	1:20	1:50	1:100	1:200	1:500	1:10	1:20	1:50	1:100	1:200	1:500	1:1,000
530	C	C	C	C	++	+	+	−	−	−	−	−	+	−	−	−	−	−	−
533	C	C	C	C	++	+	−	−	−	−	−	−	−	−	−	−	−	−	−
537	C	C	C	C	+++	−	−	−	−	−	−	−	−	−	−	−	−	−	−
550	C	C	C	C	++	−	−	−	−	−	−	−	−	−	−	−	−	−	−
562	C	C	C	C	++++	+	+	−	−	−	−	−	−	−	−	−	−	−	−
578	C	C	C	C	+++	+	+	−	−	−	−	−	−	−	−	−	−	−	−
583	C	C	C	C	++	+	+	−	−	−	−	−	−	−	−	−	−	−	−
529	C	C	C	C	++++	+	+	−	−	−	−	−	−	−	−	−	−	−	−
6	−	−	−	−	.....	.....	C	C	C	+++	+	−	+	−	−	−	−	−	−
209	−	−	−	−	−	.....	C	C	C	++	+	−	−	−	−	−	−	−	−
432	−	−	−	−	−	.....	C	C	C	C	+	−	−	−	−	−	−	−	−
436	−	−	−	−	−	.....	C	C	C	C	+	−	−	−	−	−	−	−	−
502	−	−	−	−	−	.....	C	C	C	C	++	−	−	−	−	−	−	−	−
558	−	−	−	−	−	.....	C	C	C	C	−	−	−	−	−	−	−	−	−
Bov. Pn. I	−	−	−	−	−	.....	−	−	−	−	−	−	C	C	C	C	C	++	+
9	−	−	−	−	−	.....	−	−	−	−	−	−	C	C	C	C	C	++	+

soon became apparent that the rabbits receiving Group I and Group II strains developed agglutinins slowly. Individuals receiving a single Group III culture produced agglutinins much more rapidly. Tests were made from time to time; when it seemed that the maximum titer was reached the animals were bled. Each individual's serum was tested against all strains. The results are recorded in Table 3.

It may be mentioned that the best results were obtained when the growths from 24-hour slant agar cultures suspended in salt solution were used as antigens. The density of the suspensions was about 2.5 with the Gates's (9) apparatus. All tubes were incubated at 38 degrees C. for 18 hours. Groups I and II agglutinate slowly; clumps are rarely visible before the sixth or eighth hour. Agglutination of the Group III organisms takes place rapidly; clumps begin to form in a few minutes, and all the organisms are usually down within 6 or 8 hours.

From Table 3 it will be noted that the serological grouping follows the cultural grouping to a considerable degree. All strains of Group I are agglutinated well up to the titer limits with Group I serum. All strains of Group II, except 502, are likewise agglutinated by their homologous group serum. The same holds true for Group III. In no instance has cross agglutination taken place. When the serum is absorbed by a single group strain the agglutinins are uniformly absorbed for all members of the group.

Strain 502, although possessing cultural characters in common with Group II, fails to excite the same immunological process. Dochez and Gillespie (10) have brought out the fact that among the pneumococci distinct serological differences exist among organisms having cultural characters in common.

The production of a polyvalent serum was next attempted. Rabbits were immunized with suspensions of cultures 530, 432, 502 and Bov. Pn. I. As in the previous observations, strong agglutinins for strain Bov. Pn. I developed rapidly. Tests against culture 530 showed moderate agglutinin formation. The agglutinins were not as strong for culture 432. Apparently strain 502 excites but little agglutinin formation in the rabbit, since it was incompletely clumped only in the lowest dilutions (1:5 and 1:10).

DISCUSSION

It might be well to emphasize some of the more important points brought out by these observations. That the term *Bacillus bovisepticus* can no longer be taken to represent a single strain or species of organism seems clear. From the limited material available it has been possible to recognize three distinct cultural groups. Perhaps a study of a greater number of cultures may disclose a larger number of aggregations. In fact at this time another culture has been isolated which differs from any of those described. Of still more importance to those concerned in the study of animal diseases are the serological differences manifested. In the main the serological grouping follows the cultural grouping. A single strain has produced agglutinins for all other strains with similar characters. This has held true with a single exception. Perhaps a study of more strains may disclose more immunological groups. These facts must be taken into account when attempts are made to control outbreaks with antisera or vaccines.

Through a knowledge of the specific characters of members of the *bovisepticus* organisms it has been possible to trace various types of infection in a particular herd. One of the first strains isolated (9) was obtained in February, 1917. This is the only Group III organism cultivated from this herd. Early in 1917 a Group II culture (6) was isolated by Dr. Smith. During the years 1918, 1919, 1920, and in January, 1921, he found such organisms in calves associated with primary infectons with *B. actinoides*. Evidently this type had become endemic. During the later months of 1920 a fresh virus (Group I) was introduced with newly purchased cows. A small outbreak promptly ensued. This subsided, but sporadic cases continued to develop in both the adults and calves. This organism has become the predominating type. Future studies will determine whether or not it will entirely replace the preceding types and in turn be replaced by a freshly introduced virus.

SUMMARY

Sixteen organisms isolated from cases of pneumonia occurring in cows and calves have been studied. Morphologically all cultures resemble each other. It has been possible by studying their fermentation and other characters to divide them into three well-defined groups. In the main serological relation-

ship has been found to follow the cultural grouping. A serum prepared by immunizing a rabbit with a single Group I strain agglutinates all Group I cultures. The same is largely true for Groups II and III. In no instance has cross agglutination occurred. Absorption of a serum with a single group strain exhausts the agglutinin to the same degree for all group strains.

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DISCUSSION

DR. HOSKINS: Mr. Chairman, I am very glad Dr. Jones was given an opportunity to present his paper. For a number of years we have been trying to get somebody from the Rockefeller Institute, either Dr. Smith or Dr. Jones, to contribute to the program of the Section on Sanitary Science and Police. This year it appears we have been successful. Personally, I am very much gratified that this opportunity was given Dr. Jones this morning.

I would like to discuss the paper very briefly. I brought a paper to this meeting which was read by title in the Section on Education and Research, dealing with some investigations on bovine hemorrhagic septicemia, more specifically the shipping fever of calves, which is looked upon more as the pulmonary type of hemorrhagic septicemia in cattle. A very brief summary of the contents of that paper shows that we were able to isolate two types of *Bacterium bovisepticum* from the same animal. These two types were not differentiated in the same manner that Dr. Jones has used for differentiating his types. Our two types differ more according to virulence. Of the two types which we isolated one was secured from the lungs of a

calf dead of stocks-yards pneumonia, or shipping fever, and the other strain was isolated from the hemorrhagic muscle tissue, presumably the blood, of the same calf. The lung strain was obtained by plating. An emulsion of the same material which gave us the organism by plating failed to kill rabbits. We speak of that as our non-virulent lung strain.

The other strain, obtained from the muscle, was isolated both by plating and by rabbit passage. We speak of that as our virulent muscle strain. Bear in mind that these two strains, a virulent and a non-virulent, were isolated from the carcass of the same animal. These two strains agree with either Dr. Jones' type two or type three. They have the usually accepted fermentation reactions, dextrose positive, lactose negative, and saccharose positive. Both strains are much alike morphologically and culturally, except when we come to examine bouillon cultures. There the two strains show marked differences. These agree with the differences described recently by De Kruif, in his study of rabbit septicemia, where he has apparently demonstrated the co-existence of virulent and non-virulent strains of the rabbit septicemia organism in the same culture. I believe we have gone one step further in isolating the two strains separately from the same animal.

Two years ago I presented a paper before the Missouri Valley Veterinary Association, and at that time predicted that some of these days we would be dividing or typing the hemorrhagic septicemia organisms very much in the same manner as we are now typing the pneumococcus group. I believe that Dr. Jones has made true that prediction.

I believe I will say, however, that if in isolating a hemorrhagic septicemia organism from suspected material, we obtain an organism which corresponds to Dr. Jones' type one, personally, I would hesitate to call it a hemorrhagic septicemia organism. You will note that it ferments lactose and that it is hemolytic. Those two characteristics in themselves would prompt me to throw it out as a typical hemorrhagic septicemia organism. Also, bear in mind the difference in the agglutination tests, as shown in the lower table. Note that where you take strictly true types, either two or three, and cross-agglutinate against type one, there is no cross-agglutination.

DR. JONES: Group one is apparently what Magnusson de-

scribes in Lapland. The American Bacteriological Association has established a new tribe called pasteurella. Their requirement for the hemorrhagic septicemia is that they are nonmotile rods which produce a little acid in carbohydrates. They are negative to Gram stain and parasitic for animals. Certainly group one can well be placed within such classification. For these reasons they have been placed with the pasteurella. They are undoubtedly what people have always assumed to be bovisepticus. Whether they are or not, time will tell.

DR. EICHHORN: May I ask if Dr. Jones has conducted any experiments along immunological lines?

DR. JONES: A little work along this line has been done. I can produce protecting serum for group three organism. A group two serum has thus far failed to protect against group two cultures.

ANTITUBERCULOSIS VACCINATION

The work of Calmette and Guérin on the vaccination of cattle against tuberculosis with cultures of bovine bacilli grown on bile and glycerin, which has been previously referred to in THE JOURNAL,[1] is reviewed and discussed by L. Panisset in the *Revue Générale de Médecine Vétérinare*,[2] with the following conclusion:

"The practical value of the method of Calmette and Guérin can be determined only by extended experimentation on a large number of animals during a number of years corresponding to the mean duration of the economic life of bovines. However, in the light of the results already obtained, the bacillus cultivated on bile is worthy of attention because of its harmlessness for bovines and the slowness of its resorption. Furthermore, it is harmless to man. We may therefore admit that it is worth using for the vaccination of bovines, without danger, for conferring on them, if not immunity, the resistance of which research in antituberculosis vaccination has revealed the mechanism and demonstrated the possible realization."

Recently-qualified and somewhat haughty graduate: "Oh, yes, my practice has increased 100 per cent since Christmas."

Candid acquaintance: "Somebody brought in another dog, then?"—*The Veterinary Record.*

[1] Vol. 11 (n. s.), p. 599, Feb., 1921; vol. 12, p. 274, June, 1921.
[2] Vol. 30, p. 313, June 15, 1921.

CLINICAL AIDS IN THE DIFFERENTIAL DIAGNOSIS OF THE COMMON POULTRY DISEASES [1]

By F. R. BEAUDETTE

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THIS PAPER is written with the view of aiding the general practitioner in the differential diagnosis of the more common poultry diseases and not as a guide for laboratory diagnosis. The diseases discussed will be those peculiar to this section of the country. It is realized that the practitioner's diagnosis in most cases must be made in the field without laboratory facilities and that his judgment is based principally upon the history, symptoms and postmortem findings; therefore these points will be discussed rather than a detailed description of the bacteriological findings in the case. In the septicemias a differentiation is very often impossible and must be determined by a bacteriological examination. Such a differentiation is often not necessary, since the control measures for one will suffice for the other. In those cases where vaccine therapy is to be used, an accurate diagnosis is, of course, necessary, and here the laboratory may be called upon for confirmation.

An analysis of the records shows that roup is the most widespread and most frequent disease of poultry with which we have to contend. Contrary to most opinions, this condition is found to occur throughout the year, and not in winter, as is commonly supposed. The ravages of cholera are fohnd to decrease somewhat during the winter months, while fowl typhoid seems to be more prevalent in spring and early summer. Blackhead appears to be most common in the month of October, and tuberculosis has no seasonal variations. White diarrhea is, of course, a seasonal disease, occurring during the hatching months of March, April and May. This year botulism has been encountered very often, especially after heavy rains.

This paper will, therefore, necessitate a discussion of the above-mentioned diseases, together with those rare maladies from which they are to be differentiated.

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[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

FOWL CHOLERA

Fowl cholera is an acute infectious disease of a septicemic nature affecting fowls, geese, ducks, turkeys and pigeons. It is characterized by a continuous high fever, diarrhea and general depression. The mortality may run as high as 90 per cent. The course of the disease is rapid, death often occurring in 24 hours after symptoms have developed. One usually gets the history that dead birds were found under the roots or on the nests. In very acute cases prodromal symptoms are often absent. In chronic cases the birds may linger for several weeks and in some cases recover. Affected birds are greatly depressed; the head is held close to the body, the feathers are ruffled, the comb and wattles are usually cyanotic, and a diarrhea is always present. The color of the droppings is usually yellow, though they may be of a greenish tinge or even streaked with blood. The bird refuses food and in the later stages of fatal cases water is also refused. The eyes are kept closed in the later stages of the disease, and a slime collects in the mouth. In chronic cases emaciation is quite marked.

On opening the carcass of a bird dead of cholera the typical picture of a septicemic disease is found. The blood vessels of the intestines are highly congested. Hemorrhages are found throughout the intestines, though more particularly in the first and second portions of the duodenum, and in the rectum, and less frequently in the ceca. The liver is congested and friable. The kidneys are marked with white lines indicating the portion of the tubules distended with urates. The ureters are likewise filled with the same material. The spleen is congested and friable. The pericardial sac is partially filled with a straw-colored fluid which may be fibrinous, and the surface of the heart shows petechial or ecchymotic hemorrhages, particularly along the course of the coronary vessels. The lungs are usually pneumonic.

Cholera is to be differentiated from fowl typhoid, which at times is very difficult. In fowl typhoid the same symptoms may be present with the exception of a profuse diarrhea. If diarrhea is present in the latter condition the droppings are more greenish in appearance. In fowl typhoid the comb and wattles are rarely cyanotic, though they may show congestion; usually they are anemic. The intestines contain a more solid mass and appear anemic. The duodenum may contain a quantity of bile

giving it a greenish tinge. White spots on the surface of the liver and heart in the case of fowl typhoid will aid in the differentiation. The temperature and color of the comb will differentiate cholera from botulism.

FOWL TYPHOID

Fowl typhoid is also a specific infectious disease of the fowl, and at present is more prevalent in this section than cholera. As previously stated, the comb and wattles are usually dry and anemic. The mucous membranes of the head are pale and the bird is depressed. Older stock is more often affected than young. Unlike cholera, the course may extend over a week or so, except in chronic cases, when it is much longer. The mortality is at times as high as in cholera.

The autopsy shows an anemic condition of the intestines, though there may be petechial hemorrhages in the first and second portions of the duodenum. They contain little feces, and this is usually stained with bile. The liver shows on its surface white spots about the size of a pin-head and the spleen is congested and softened. The kidneys are usually of a clay color; at other times congestion is outstanding. Distention of the gall bladder is almost a constant finding. The heart shows white spots similar to those of the liver. The lungs are normal in contrast to the pneumonic condition in cholera.

ROUP

Roup is an infectious disease which may manifest itself in several ways. The condition is variably termed contagious catarrh, coryza, cold, pox, diphtheria, swell head, contagious epithelioma, etc., depending on the location of the lesions. One or more forms may be present in the same individual.

The mortality of roup is from 5 to 80 per cent, and the course varies with the severity of the disease and parts affected. In the cutaneous form recovery may take place in a week or so and the mortality is very low, while in the diphtheritic and ocular forms the course is much longer and the mortality is usually high. In all cases the egg production is decreased. It is a disease of the mucous membranes of the head and the unfeathered portions of the body. Birds of all ages are affected except chicks a few days old. When the nasal cavity is involved there is at first a dirty, foul-smelling discharge; later this be-

comes thicker and finally causes the stoppage of the cavity. The mass may enlarge and cause a bulging in the mouth. The bird is compelled to breathe through the mouth, and this may cause a drying of the tongue, often called pip, which may result from any condition that will cause a drying of the tongue, usually associated with oral breathing.

The mouth is the location of the diphtheritic form, and here patches of false membrane are found, which vary in size from a pin-head to several millimeters in diameter. At first they are white; later they turn gray or yellowish brown. They may be removed from their attachment, and an easily bleeding raw surface is left, from which another membrane may develop. These patches may be located anywhere in the mouth, and may extend down the trachea to the bronchi or down the esophagus to the crop. When lesions are located in the larynx the gravity of the condition is increased.

In the ocular type a watery discharge from the eye is first noticed. This becomes thicker, and the frequent closing of the eye causes the material to become frothy. Finally the eyelids are glued together and the mass collects beneath. If the pressure is not released, destruction of the eye will result. If the lids are separated a yellow, cheesy mass protrudes. A similar mass may collect in the suborbital sinus, causing a bulging over that point, hence the term "swellhead."

The cutaneous form is popularly termed chicken pox or contagious epithelioma. The comb and wattles and occasionally the unfeathered portions of the body are found to be affected. This form manifests itself by the formation of wartlike growths which may vary in size from a pin-head to several millimeters in diameter. The eyelids may be covered with the growths. When the growths are found in the corners of the mouth the process is usually continued to the oral cavity as the diphtheritic form. A removal of the wart leaves a granular, easily bleeding surface, from which another growth may develop.

Rarely an involvement of the joints of the legs and wings is found. This constitutes what might be called an articular roup. The characteristic exudate in such cases is found in the joint cavity, which seriously interferes with movement of the part. There is swelling and on palpation the area feels hot.

TUBERCULOSIS

Tuberculosis is a common disease of the fowl, characterized by "going light," to use the poultryman's term. Geese, turkeys and pigeons are also subject to this malady.

The symptoms are few until the disease is far advanced. Whenever individuals gradually emaciate and finally die, tuberculosis may be suspected. In the later stages of the disease the comb appears anemic, the bird is very light, the sternum is almost devoid of flesh, and the general appearance is that of an unthrifty condition. The individual is disposed to remain in one position with the head drawn close to the body and the tail feathers drooped. The appetite is usually poor.

It must be remembered that tuberculosis in the fowl is principally a disease of the abdominal organs, and especially of the spleen. It is estimated that in 90 per cent of the cases the spleen is found to be affected. The lesions are found in the organs themselves, and not in the lymph nodes which drain them, as in the case of other animals. Caseation rather than calcification is the rule. The nodules are about the size of a pin-head, though larger ones may be found. Whatever the size, they are usually uniform and equally distributed. The intestines may show nodules externally, the size of a pea, and these are extended throughout the length of the gut. The appearance of the intestines resembles somewhat that of an infestation with *Davainea tetragona,* the parasite causing nodular tæniasis. A heavy infestation of the air-sac mite, *Cytodites nudus,* will cause an emaciation similar to tuberculosis, though in this case the lesions of tuberculosis are absent and the parasites can be found as white specks usually on the folds of the mesentery. In aspergillosis emaciation is an outstanding symptom, hence this condition is to be differentiated from tuberculosis by finding the areas of fungoid growth in the lungs or between the lungs and the thoracic wall. Lung lesions in the case of tuberculosis are relatively rare, and when present there is usually an extensive involvement of the abdominal organs. Bumblefoot may be confused with the articular form of tuberculosis, and is differentiated by a postmortem and the more subcutaneous location of the lesion. Birds heavily infested with intestinal parasites may show symptoms not unlike tuberculosis, but an examination of the intestinal tract will disclose the presence of parasites.

BLACKHEAD

Infectious enterohepatitis or blackhead is a highly destructive disease of turkeys, though chickens occasionally are affected. The period of incubation is from three to four weeks. The course of the disease depends upon the age of the affected bird. In young chicks this may be a week, while older birds will linger for three or four weeks before death takes place. Affected birds are drowsy and indisposed to move. When forced to move, a slow gait is characteristic. The appetite is diminished, though water is taken as usual. A diarrhea is always present from the start, and the characteristic yellow color will aid in the diagnosis. In the last stages of the disease the comb becomes very dark as a rule, hence the term "blackhead."

The lesions are confined principally to the liver and intestines, particularly the ceca. On the liver ulcers may be found of various sizes, from a pin-head to several millimeters in diameter. These are usually depressed and of a yellowish color. In advanced cases the organ may be literally covered. The blind gut presents a chronically thickened appearance. In acute cases in poults the liver may be free from lesions while the ceca shows but slight ulceration or congestion.

The fact that this is principally a disease of young stock will aid in the differentiation. The hepatic ulcers are sufficient to differentiate this condition from other diseases, especially tuberculosis of the liver, since in the latter condition there is a lack of depression. In chickens the liver rarely shows ulceration. The lesions are principally confined to the ceca, though even here they may be absent. The absence of other lesions and the finding of solid blood-stained cores in the ceca will indicate this affection in fowls.

WHITE DIARRHEA

Bacillary white diarrhea is practically the only infectious disease of importance affecting chicks, though certain noninfectious diseases may bear some resemblance to this condition. The disease is contracted as an ovarian infection through the egg, the hen being but a carrier of the organism. Chicks may also contract the infection from incubators, etc., previously contaminated by infected chicks. Chicks are most susceptible during the first two or three days after hatching; after this time they are relatively immune. The mortality runs very high and may reach 80 or 90 per cent.

Diarrhea is the outstanding symptom and the droppings are white and thin mixed with considerable mucus. The chick peeps constantly as if in pain. An unthrifty condition is noticeable, the neck is drawn in, and the wings are drooping. The chicks are usually found close to the hover. The abdomen is usually enlarged, giving the chick a "pot-bellied" appearance. The hind parts become soiled with the excrement, and "pasting up" is not uncommon. As a fatal termination approaches, the affected individual falls to the ground and after a period of coma dies. On opening the chick the yolk is found unabsorbed. A yellow color of the liver is usually observed. The intestines contain a semisolid material with much mucus. The lungs show congestion.

The high mortality immediately after hatching, together with the absence of lesion other than those of the liver, are diagnostic of this condition. Another condition resembling white diarrhea has been found in this section, though in the latter case very few chicks are hatched from infected eggs. The infection usually kills the chicks about the nineteenth day of incubation. If the chick does hatch it usually dies in the course of a few days. The lesions are not distinguishable from those of white diarrhea, though the organism differs markedly.

Rose-chafer poisoning is to be differentiated from white diarrhea by the finding of the chafers in the crop. The latter condition is found more often in the southern section of the country about the hatching time and early summer.

BOTULISM OR LIMBERNECK

Another condition quite common this year in this section has been diagnosed as botulism, commonly termed "limberneck." The onset of this disease is very sudden. Half of the flock may die in the course of two or three days. It has been noticed to occur especially after a season of heavy rainfall, which perhaps favored the development of the toxin in the food material. Occasionally a history of feeding garbage containing spoiled canned goods is obtained.

Affected birds may be able to stand, though the individual is unable to hold its head up, and the top of the comb may touch the ground. In other cases the bird lies lifeless on the ground with the head stretched out in front. The comb and wattles are of a distinct bright red color, and this symptom is of consider-

able diagnostic importance. The eyes are kept closed, and a slimy material collects in the mouth. Diarrhea may be present and the area surrounding the vent is of a bright red color. In the later stages of the disease the feathers are found to come out easily. The temperature is at first normal or slightly elevated; later it gradually becomes subnormal and may go as low as 92 degrees F. If the temperature begins to rise after being subnormal, recovery can be predicted. The birds refuse food and water entirely until recovery takes place. The only lesions found are confined to the intestinal tract, and these are in the nature of a catarrhal enteritis throughout, and in some cases petechial hemorrhages are found.

Botulism is differentiated from cholera by the limberneck symptom and the absence of lesions other than those of the intestinal tract. The subnormal temperature is to be considered as diagnostic, and the absence of cyanosis of the comb is a constant feature. The lack of white spots on the liver and heart will aid in the differentiation from fowl typhoid.

It will be seen that the greatest difficulty will be experienced in differentiating between cholera, fowl typhoid, and possibly botulism. While the latter condition is characterized by a subnormal temperature, bright red color of the comb and "limberneck" symptoms, the former two are to be differentiated by a careful inquiry into the history and by observation of the postmortem findings.

Dr. H. Martel, chief of the bureau of veterinary inspection for Paris and the department of the Seine, has made an investigation into the condition of cans containing frozen opened eggs intended for the use of bakers, following the occurrence of many cases of poisoning from eating pastry and cakes with "cream" fillings made with such eggs. In many cans were found mold, streptococci, staphylococci and *Bacillus coli.* The eggs in question were imported from China. Dr. Martel has recommended sanitary precautions to guard against the danger. It is said that the frozen eggs should not be allowed to thaw until shortly before use and should be used only for prolonged baking at a high temperature.

According to a news item a female fly lays ten thousand eggs. Thank goodness a female fly does not cackle.—*London Punch.*

THE HYDROGEN ION CONCENTRATION OF HORSE SEMEN [1]

By W. S. ANDERSON, A. M. PETER *and* D. J. HEALY

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MANY noted Thoroughbred and Standardbred stallions are located in the bluegrass region of Kentucky and the breeding of such animals is an important industry. The uncertainty of impregnation of the mare is one of the difficulties encountered and at times causes serious financial loss.

A microscopical study of the semen of those stallions which failed to impregnate the mares demonstrated that many, in some cases all, of the spermatozoa were motionless immediately after copulation. It occurred to us that a study of the hydrogen ion concentration of the semen in relation to the motility of the spermatozoa would be interesting and valuable. Upon examining the literature we failed to find a record of the hydrogen ion concentration of semen.

All protoplasm carries electric charges, and every living cell is essentially an electric battery. Protoplasmic activity develops an electric disturbance, the current flowing from the more active to the less active portion of the protoplasm, and many of the activities of protoplasm bear a direct relation to the ratio of electrolytes which it contains. Of the many electrolytes present in protoplasm, the hydrogen ion has been most successfully studied, and its concentration has been correlated with many of the physiological activities of biologic tissues and fluids.

The chemical reaction of protoplasm may be expressed in terms of hydrogen ion concentration, and very slight variations in this concentration profoundly affect the colloidal condition, enzymic activity and respiratory processes of protoplasm.

Living cells require the maintenance of a strictly limited hydrogen ion concentration in their environment, a limitation frequently between 0.00001 and 0.00000001 gram ionized hydrogen per liter. Enzymes are extraordinarily sensitive to minute changes in the hydrogen ion concentration of the medium in which they are working. Reed demonstrated that the oxidases

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

present in the potato and apple were quite active at pH 4.2 and inactive at pH 3.3. Fortunately protoplasm contains salts of carbonic and phosphoric acids, which act as "buffers," checking pronounced changes in hydrogen ion concentration, the bicarbonate acting by releasing or absorbing CO_2, while the phosphates readily change from mono to diphosphate and vice versa.

Some of the more important biologic fluids of which the hydrogen ion concentration has been determined by others are gastric juice, pH 0.9–1.6; perspiration, pH 4.5; urine, pH 6; milk (cow), pH 6.6–6.8; muscle juice, pH 6.8; blood, pH 7.4; normal plant cell sap, pH 5.3–5.8. It is interesting to note that gastric juice contains a free mineral acid in considerable strength and that it may be kept for months without becoming putrid and with very little change in its digestive action or in its total acidity.

Modern methods of determining hydrogen ion concentration are much more reliable than methods of determining the chemical reaction of protoplasm based upon its color reactions to various staining reagents. Two methods are available for the measurement of hydrogen ion concentration in solutions—the colorimetric and the electrometric. The color indicators of chemical reaction are substances which ionize in solutions containing definite hydrogen ion concentrations. Above a certain concentration of hydrogen ions phenolphthalein in solution remains undissociated and colorless. Below this concentration of hydrogen ions phenolphthalein dissociates with the production of color. Methyl red in solution dissociates with a change of color at a hydrogen ion concentration greater than that at which phenolphthalein dissociates. Thus a series of indicators which dissociate with change of color at successively diminishing hydrogen ion concentrations have been obtained and may be used to determine the hydrogen ion concentration of solutions at various points between N/10 HCl and N/10 NH_4OH.

The hydrogen ion carries a positive electric charge, thus maintaining an electric potential in the solution. The electrometric method measures this potential by means of a potentiometer and galvanometer. When the biological process under observation is constant over a wide range of hydrogen ion concentration, an approximate determination is sufficient, and the colorimetric method may be used. When the process is seriously affected by the hydrogen ion concentration of the solution, the

electrometric method should be used, because it is the most accurate method available. Minute variations in hydrogen ion concentrations indicate the position of equilibrium among the important electrolytes present. Thus the determination of hydrogen ion concentration takes its place beside the use of the delicate analytical balance or the use of the thermometer.

The apparatus used in this investigation consisted of the Clark hydrogen ion apparatus supplied by the Leeds and Northrup Company, a portable lamp and scale galvanometer, a Leeds and Northrup type K potentiometer, and a standard Weston cell, model 4. Two Columbia dry cells furnished the working current. Hydrogen, obtained from a Kipp's generator, was passed through two wash bottles (the first containing N/2 NaOH and a small quantity of lead acetate, the second containing distilled water), and then conducted into the hydrogen electrode vessel. A normal KCl calomel electrode was used, and normal KCl solution saturated with calomel was used in the connecting vessel. Measurements were made at room temperature without the aid of a constant temperature bath, but the temperature of the calomel electrode was carefully noted immediately following each measurement, the reading being made to the nearest degree or half degree Centigrade. Following Clark's suggestions hydrogen was not bubbled through the semen. Clark states that "in biological fluids containing carbonate the double effect of the CO_2 upon the partial pressure of hydrogen and upon the hydrogen ion equilibrium renders accurate measurements difficult. It is of more importance to maintain the original CO_2 content of the solution than it is to be concerned about the effect of CO_2 upon the partial pressure of hydrogen."

The accuracy of electrometric measurements made by such an apparatus under the above conditions depends upon the stability of the electromotive force balance for a definite period. In this investigation the E. M. F. balance was maintained for a period of two minutes. To test the accuracy of the measurements a N/10 HCl solution was measured as shown in Table 1.

As a further test two standard "buffer" solutions were measured electrometrically and colorimetrically as shown in Table 2.

The colorimetric method measures to two-tenths of a pH value. Tables 1 and 2 demonstrate that without extensive equipment electrometric measurements of hydrogen ion concentrations afford a fair degree of accuracy. Great refinement in

correcting for barometric and temperature fluctuations is necessary only in physico-chemical research.

The semen used in this investigation was obtained as the mare was served and was delivered to the laboratory in a clean sterile container with as little delay as possible. The measurements were made within an hour or two of the service. The quantity

TABLE 1.—MEASUREMENT OF N/10 HCl SOLUTION.

Solution and Measurement	Time	Reading	Temperature	pH Value	Theory
		Volt	° C		
N/10 HCl, factor 1.0006...	10:20	0.3490	31	1.08	.....
	10:22	.3490			pH 1.07
Duplicate measurement....	10:37	.3475	31	1.06	
	10:39	.3475			

TABLE 2.—ELECTROMETRIC AND COLORIMETRIC MEASUREMENT OF TWO STANDARD BUFFER SOLUTIONS.

Solution and Measurement	Time	Reading	Temperature	pH Value	Colorimetric pH Value
		Volt	° C		
Buffer solution 1	2:17	0.6995	32	6.88	7.0
	2:19	.6995			
Duplicate measurement..	2:43	.6995	32	6.88	7.0
	2:45	.6995			
Buffer solution 2	3:06	.7670	32	7.99	8.2
	3:08	.7670			
Duplicate measurement..	3:26	.7675	32	8.00	8.2
	3:28	.7675			

of semen obtained varied from 7 to 20 c.c. With the larger quantities of semen the hydrogen electrode vessel was completely filled, the platinum electrode placed in position, the semen flushed out with hydrogen, which was used freely, and the vessel half filled with semen, and, of course, remaining half filled with hydrogen. The hydrogen electrode vessel was now closed and shaken for five minutes, after which it was so adjusted that the platinum electrode was half immersed in the semen and the connections were made with the potentiometer, the apparaus remaining undisturbed for six minutes, after which the readings were made. With the smaller quantities of semen the hydrogen vessel was first filled with CO_2-free water, flushed out with hydrogen, half filled with semen and then treated as above. Measurements were made as shown in Table 3 to de-

termine the effect of thus filling the hydrogen vessel with CO_2-free water before introducing the semen.

Table 3 demonstrates that the effect of the preliminary use of CO_2-free water is to reduce the hydrogen ion concentration of the semen 0.125 of a pH value.

With the electrometric measurements of normal horse semen we obtained the results shown in Table 4.

TABLE 3.—MEASUREMENTS TO DETERMINE EFFECT OF FILLING HYDROGEN VESSEL WITH CO_2-FREE WATER BEFORE INTRODUCING SEMEN.

Semen	Time	Reading	Temperature	pH Value
		Volt	° C	
Sixth Stallion	9.50	0.7280	22.5	7.55
	9.52	.7280		
After using CO_2-free water	10.16	.7379	22.5	7.70
	10.18	.7379		
Seventh Stallion	10.42	.7300	22.5	7.58
	10.44	.7300		
After using CO_2-free water	11.03	.7356	22.5	7.68
	11.05	.7356		

TABLE 4.—ELECTROMETRIC MEASUREMENTS OF NORMAL SEMEN.

Stallion	Time	Reading	Temperature	pH Value
		Volt	°C.	
1. Etewa	10.11	0.7335	26.5	7.43[1]
2. Huon	9.47	.7230	23.5	7.44
3. Uncle	10.03	.7255	23.5	7.47
4. Rapid Water	11.13	.7080	19.5	7.14[1]
9. Prince Palatine	9.20	.7010	23.5	6.94[1]
12. Fritter Gold	9.38	.7325	22.0	7.51[1]
14. Fairplay[2]	11.40	.7180	29.0	7.24
Average				7.31

[1] Correction for CO_2-free water (—0.125 pH) has been deducted.

[2] Sire of Man-O'-War.

The average of seven electrometric measurements of normal horse semen was pH 7.31, ranging from pH 6.94 to pH 7.51.

With horse semen containing nonmotile spermatozoa we obtained the results shown in Table 5.

The average of five measurements of abnormal horse semen was pH 7.58, ranging from pH 7.49 to pH 7.76. Therefore the average hydrogen ion concentration of horse semen containing nonmotile spermatozoa was 0.27 of a pH value less than the average of normal semen.

That the hydrogen ion concentration of horse semen is not readily altered is demonstrated in the accompanying diagram (figure 1). In this experiment we added to one 10 c.c. portion

TABLE 5.—ELECTROMETRIC MEASUREMENTS OF SEMEN CONTAINING NONMOTILE SPERMATOZOA.

Stallion	Time	Reading	Temperature	pH Value
		Volt	°C.	
Fifth	8.50	0.7280	19.5	7.49[1]
Sixth	9.17	.7320	19.5	7.55[1]
Seventh	9.07	.7280	22.5	7.55
Eighth	9.23	.7300	22.5	7.58
Thirteenth	9.47	.7480	22.5	7.76[1]
Average				7.58

[1] Correction for CO_2-free water (—0.125 pH) has been deducted.

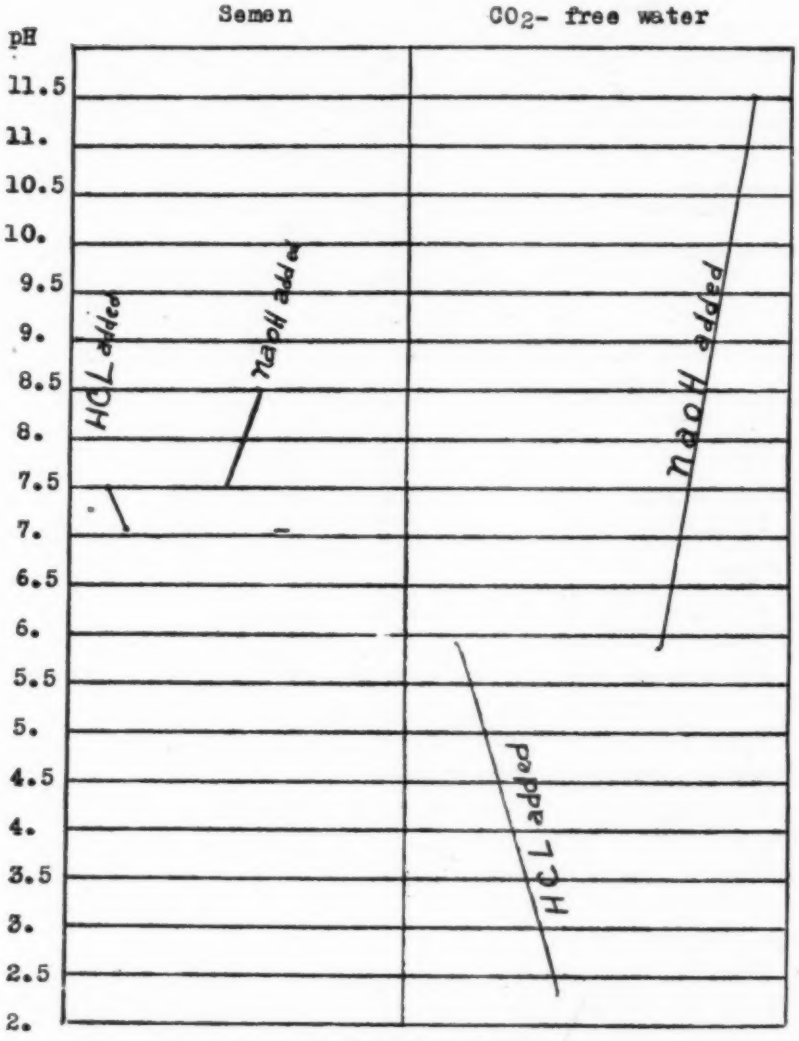

Fig. 1—Buffer Effect of Semen

of semen, of pH 7.56, 0.5 c.c. N/10 HCl; and to another 10 c.c. portion, 0.5 c.c. N/10 NaOH, and again measured the pH values. For comparison CO_2-free water was treated in a similar manner.

It appears from our measurements of the semen that a hydrogen ion concentration of pH 7.5 indicates a critical condition of the equilibrium of the electrolytes present in horse semen. Above this concentration the spermatozoa are active; below, they are inactive. A preliminary chemical analysis of portions of the above normal and abnormal semen gave the results shown in Table 6.

TABLE 6.—CHEMICAL ANALYSIS OF SEMEN.

Items	Per cent by weight	
	Normal	Abnormal
Total solids, dried at 105° C	2.38	3.49
Ash	0.78	0.60
Total nitrogen (N)	0.241	0.366
Total phosphorus (P)	0.017	0.028
Per cent ash in total solids	32.8	17.2
Per cent phosphorus in total solids	0.7	0.8
Per cent nitrogen in total solids	9.9	9.5

The proportion of total solids is distinctly larger in the abnormal semen than in the normal. The proportion of ash in the total solids of the abnormal semen, however, is markedly less than in the normal. The proportions of nitrogen and phosphorus in the total solids are sensibly the same in both.

SUMMARY

The average hydrogen ion concentration of normal horse semen was pH 7.31.

The average hydrogen ion concentration of horse semen in which the spermatozoa were inactive was pH 7.58.

The hydrogen ion concentration of horse semen is not readily altered.

It has been shown that without extensive equipment electrometric measurements of hydrogen ion concentration afford a fair degree of accuracy.

DISCUSSION

DR. FITCH: I think too few of us realize how important this subject is with reference to the maintenance of life, and I think too few of us realize how much work has been done on this important secretion from the blood. I have been interested in the secretion myself for something over a year, and was surprised, in attempting to look over the literature, to find out how little had been done, how little information was available in regard to normal secretion. With ignorance of the normal secretion of course we can know but very little

of the abnormal condition. I found some work had been attempted by some Russians and some Italian physiologists about the time the war began, but since then we have had no further information. I just wanted to say a word in commendation of physiological research along this line, and hope that it may be extensive and that it may proceed, and that America may find some results that will lead to higher information. We don't doubt there may be some practical knowledge from this secretion that does affect sterility, that in many cases it is the male that is incriminated quite as much as the female. I repeat that I hope that the investigation will continue.

HORSE SITUATION

We all know there are stock market cycles and business cycles, but few of us realize that there are horse cycles as well. Experts of the Department of Agriculture are working out these horse cycles, and they have recently come to the conclusion reached by all far-seeing agricultural economists at the present time—namely, that the horse's day is just breaking. From now on we may expect increased attention to and increased profits from good horses. Horses are selling at exceedingly low prices. On June 15 horses were selling on the farms at an average price of $98, compared with $146 on June 15, 1913.

Farmers are recognizing the necessity of operating at lowest costs, and here and there are leaving their tractors and trucks in the lurch for horses. With horses selling at present prices trucks and tractors have difficulty in competing. The price of feed is away down. Here are comparative figures:

	May, 1913	Peak	May, 1921
Hay, per ton	$10.42	$24.85	$13.08
Corn, per bu.	.57	1.97	.60
Oats, per bu.	.34	1.05	.37
Barley, per bu.	.48	1.70	.49

Many more horses would be in use today if more agricultural and weekly papers would push forward the facts. Certainly the tractor people are not going to do it. An unfortunate factor in the situation is the attempt by certain big car producers to make agents take a quota of tractors in order to get cars. Such coercion is wrong. The automobile has come to stay, but horses are no more evanescent than bicycles, of which latter vehicles more were sold in 1920 than ever before. Our advice to farmers is: Breed good work horses; they will sell for double present prices some day. To manufacturers and merchants we say: If you are using horses now, keep them; if you are using trucks, get some comparative cost figures on horses vs. trucks. They will surprise you.—*United Business Service.*

FIELD OBSERVATIONS IN LOCO POISONING [1]

By O. E. TROY

Raton, New Mexico

IN the preparation of a paper on this subject I make no claim of advanced knowledge, but I have chosen the subject because it is one regarding which we have accomplished nothing and I feel it a duty to bring the matter before the veterinary profession with an appeal that it receive more careful study, commensurate with the enormous loss sustained by the livestock industry over the entire Rocky Mountain slopes.

For the past seven years I have been in constant association with the condition commonly known as "loco," both from a professional standpoint and from that of a livestock producer, and I assure you that there is no pathologic condition with which I have ever contended that presents a more difficult aspect. As to its economic importance I venture to state that in districts infested with the white loco (*Oxytropis lamberti*) the loss far exceeds all other losses combined, and its toll is not confined to actual deaths or depreciation in value of livestock, but it constitutes an absolute bar against the importation of high-grade or purebred livestock. Native stock, especially of inferior quality, does not readily eat the loco weed, except under extreme circumstances, but the higher type of imported stock can not be grazed on loco-infested ranges with impunity.

For the consideration of this paper I confine myself to the white loco (*Oxytropis lamberti*). The purple or woolly loco (*Astragalus mollissimus*) is credited with being injurious, but is of relatively little importance. The symptoms of loco poisoning will become manifest in sheep between thirty and sixty days after they begin eating the weed and will be first noted by the herder when the individual separates from the herd, always seeking the rocky knolls in search of loco weed, the head up, nose extended, unmindful of the voice which it normally obeys. The gait becomes stiff, with marked lack of coordination. The eye develops a wild, staring glare. If continued grazing on loco pasture the animal soon refuses all other feed, strays from the herd and becomes food for coyotes or dies of malnutrition.

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

The lesions found in animals suffering from loco poisoning are never such as could identify the disease. I will give here the complete autopsy on a sheep which showed symptoms of loco poisoning in February, 1921. As soon as symptoms developed it was removed from loco-infested pasture and kept in a small pasture until August 28, at which time it was destroyed for the purpose of autopsy. The animal showed typical symptoms of loco poisoning. The subcutaneous tissues were normal but entirely devoid of adipose tissues. The contents of the pleural cavities were normal in every respect. Those of the peritoneal were likewise normal. Careful search was made through the digestive tract for ulcers, which are reported to be lesions found indicating loco poisoning, but no ulcers could be located. General lack of adipose tissues was noted, although the animal had been on the best of pasture. The head was sawed through the median line so as to expose the brain tissue, which seemed normal in color and consistency, although the meningeal vessels indicated hyperemia. The spinal column was cut into sections, then severed lengthwise so as to expose the spinal cord throughout, which also seemed normal in color and consistency, though again I noted hyperemia. Other than this hyperemia I could note no lesions.

The symptoms of loco poisoning in cattle are more varied than in sheep. In fact, I have studied three distinct types of reaction to the loco poisoning. The symptoms apparently develop less rapidly than in sheep, but this may be due to the fact that they are not under constant observation. However, sixty days after cattle are noticed to prefer hilltops or rocky mesa sides on which the loco weed abounds will suffice to develop well-marked symptoms. They become gaunt from lack of water, as they will stay in a loco patch for days without drink. Constipation is marked, the gait stiff, with lack of coordination, and there is a wild, staring eye. They are intensely nervous and if startled by a sudden shout they tremble in a way painful to see. Many cases progress until they lose the senses of sight and hearing. I have watched advanced cases in a recumbent position that seemed to have hallucinations; will prehend and masticate imaginary food and will be entirely unaware of one's approach until touched.

The second train of symptoms are manifestly different. The drug must concentrate its effect upon the vasomotor instead of

motor nerves or ganglia, while the stiffness and lack of coordination are present in a milder degree, and instead of the tucked-up, gaunt appearance a distention of the abdomen is apparent, due to abdominal dropsy, which progresses until the animal becomes helpless and dies of suffocation or from a ruptured diaphragm. These cases can not be cured, but the simple operation of tapping, a trocar inserted through the linea alba about six inches anterior to the udder, will draw off the peritoneal fluid and give immediate relief. I have drained as much as eight gallons of fluid in this manner with excellent results, excepting in pregnant animals, where abortion invariably follows. These cases, if kept off the loco weed and given a ration of cottonseed cake, will make, to the casual observer, a complete recovery and the succeeding season will fatten remarkably.

Regarding the third train of symptoms, I feel that I am treading on "thin ice." I make my statements guardedly, with the hope that they will bring out full discussion and possibly lead to further study and investigation that will throw greater light on the subject. We have in the higher altitudes of New Mexico and Colorado a disease known as brisket disease, which seldom appears at an altitude less than 8,000 feet. The symptoms of this disease have a striking resemblance to those described above, except that the serum collects in the pleural cavity and pericardial sacs instead of in the peritoneal cavity. This disease appears with greatest frequency in animals taken into the mountains from lower altitudes and, in two cases which have come under my observation, from loco-infested ranges.

Dr. E. P. Johnson, of the New Mexico State College, has demonstrated that acute cases of this disease can be controlled by a judicious use of digitalin and if moved to a lower altitude will fatten and make marketable beef, although, like all other cases of loco poisoning, they never regain a normal, robust constitution.

The effect of loco poisoning on the horse is not of such great economic importance as it was formerly, owing to the rapid conversion of western ranges into farms and the fact that the horse's ration is more easily controlled, yet the loss from loco poisoning in the horse is enormous. Like the case of other species, the imported horse is more susceptible, but it is difficult to raise horses on loco-infested ranges without heavy loss. The loco-tainted colt is abnormally wild, seldom learns to lead, and

will never become reliable. If it continues to feed on loco weed the gait becomes stiff and faulty coordination develops. The sensitive nervous system becomes supersensitive, while the motor centers become slow to respond. The senses of hearing and sight are impaired and ultimately total blindness develops, deglutition becomes difficult and impossible. On the range the animal usually dies after falling between the rocks, in a ditch, or in shallow water where it drowns. If kept off the weed from early stages horses can be kept serviceable but never reliable.

The effect of advanced loco poisoning upon goats is one of the most pitiable sights I ever witnessed. Possibly because of their remarkable vitality they endure greater punishment and will follow the bunch when their front or hind quarters are completely paralyzed, dragging themselves in a sitting posture or walking apparently on the hind legs or head.

One of the great sources of loss from mild loco poisoning among cattle and sheep is that of abortion, and I deem it wise to caution veterinarians, and especially producers of contagious abortion vaccine, to beware of its use where loco poisoning exists, for it will not give desired results.

There is an opinion extant among investigators of loco poisoning that the condition does not consist of poisoning, but is rather a deficiency disease, or, as one investigator stated to me, "It is a condition which can be produced by feeding sawdust." I cannot agree with this conclusion. I am convinced that the weed contains a drug, a craving for which keeps the animal in search of it. I have driven animals off of loco pastures and endeavored to confine them in loco-free pastures, and I find that we can not build wire fences which are as strong as their desire for the weed, and we have had to resort to a corral in all advanced cases. Many ranges have been abandoned entirely on account of loco. Other persons have attempted to rid their ranges of the weed by digging, but the cost of this method, in my experience, is prohibitive. At present our only relief is obtained by range rotation. My observation convinces me that the loco weed develops its poisonous properties in greater quantities on high, rocky soils, mesa sides, etc., and I find that by using these soils when forage is abundant we can minimize our loss from loco. Toward the late winter and spring we endeavor to keep stock on the lower lands and bottoms. In partial support of my views on this subject I will quote the conclusions reached

by Dr. Law in his article on loco poisoning in "Veterinary Medicine," vol. 3:

1. There is some poison in loco weed which may cause the illness and if sufficient quantity is taken the death of an animal.
2. This poison is contained in the decoction obtained from the plants, and by systematically feeding it to healthy cats, cases of loco disease may be produced.
3. Taste for green loco weed may be experimentally produced in the jack rabbit.
4. From the large quantity of the plant or the decoction required to produce the disease, the poison must be weak; or if strong, it must be in a very small amount.

Since this article was published in 1905 the Department of Agriculture, in cooperation with the State of Colorado, conducted an extensive four-year experiment at Hugo, Colorado, the results of which were published in Bulletin 129 of the Bureau of Plant Industry, Department of Agriculture, in 1908. This bulletin is intensely interesting. It is the result of long, painstaking study, but the conclusions, which I will quote in part, have not been taken seriously by the profession, and if correct, have not been followed up by any logical method of cure or control which would make it of economic value. I quote in part from the introductory statement:

This discovery also seems likely to provide a basis for rational treatment of locoed stock. Unfortunately, the discovery of the fact that barium is the poisonous constituent of loco weeds came too late to aid in the search for remedial measures on the range during the period covered by this report, but those empirically arrived at have received additional support from these laboratory results. Thus the work in the field and undertaken after repeated attempts and discouraging failures by others has yielded results to persistent scientific research and promises practical aid to the now suffering livestock interests.

The livestock industry is still suffering. The above promise is as yet a promise.

The conclusions in Bulletin 129 I will quote in part:

1. Conditions analogous to those met with in locoed animals occur in other portions of the world, especially Australia.
2. The main symptoms described in stock on the range can be reproduced in rabbits by feeding extracts of certain loco plants. Those especially referred to here under the term of loco plants are *Astragalus mollissimus* and *Aragallus lamberti*.[1]
3. The production of chronic symptoms in rabbits is a crucial test of the pharmacological activity of these plants.
4. The inorganic constituents, especially barium, are responsible for this action, at least in plants collected at Hugo, Colorado. Perhaps in other portions of the country other poisonous principles may be found.
5. A close analogy exists between the chemical symptoms and

[1] *Oxytropis lamberti.*

pathological findings in barium poisoning and those resulting from feeding extracts of certain loco plants. Small doses of barium salts may be administered to rabbits without apparent effect, but suddenly acute symptoms set in analogous to what is reported on the range.

6. The administration of sulphates, especially Epsom salts, to form insoluble barium sulphate, would be the chemical antidote which would be logically inferred from the laboratory work, but of necessity would have to be frequently administered, and its value after histological changes in the organs have occurred remains to be settled. At present it seems best to rely upon preventive measures rather than antidotal treatment.

7. Loco plants grown in certain soils are inactive pharmacologically and contain no barium. In drying certain loco plants the barium apparently is rendered insoluble so that it is not extracted by water but can easily be extracted by digestion with digestive ferments.

8. The barium to be harmful must be in such form as to be dissolved out by the digestion.

9. In deciding whether plants are poisonous it is desirable not merely to test aqueous or alcoholic extracts, but also the extracts obtained by digesting these plants with the ferments which occur in the gastro-intestinal tract.

It will be noted in paragraph 7 that these investigators have found that in some soils the loco weed does not contain a poisonour property. This conforms with my observation and is the basis of the plan we now follow to avoid loss from loco. However, nothing of value has thus far been developed from these investigations to afford the promised relief to the livestock industry. The investigators above referred to conclude that "we must rely upon preventive measures."[1] With this I heartily agree. I will, therefore, briefly review the history of loco poisoning from the observations of stockmen and present a plan that may prove a feasible method of prevention.

The loco weed is infested in some localities with a parasite, a larval form of fly, which the early observers believed to be the cause of the poisoning, arguing that the parasite was eaten with the weed and contained the poison. I have been informed by three observers in widely separate areas that the infestation of this parasite destroys the loco weed. One observer who made an effort to destroy the loco weed in an 8,000-acre pasture by digging informed me that he found this parasite present on a part of his range. He purposely left an area of 10 acres to ascertain the result. This plot was marked by stakes and an estimate made of the number of loco plants. He informs me that after the second year the loco weed had entirely disappeared and that the area is still free. According to the best information I am able to collect, this fly deposits its eggs in the base of the loco

[1] A later publication of the Department of Agriculture, Farmers' Bulletin 1054, discusses preventive measures.—EDITOR.

plant, the larva burrows into the plant and destroys the root. I was unable in the limited time at my disposal to obtain specimens of either the fly or the larva to present here, but I believe the idea worthy of further study, for it may develop a feasible method of prevention for loco poisoning.

The digging of the loco weed is our only alternative.[1] If this method is adopted it must be carried out for at least three, and better, five years. I have figures which indicate this can be done at an expense of 25 cents an acre per annum, but my experience differs. There is on the market a chemical known as "Loco Lion" which is sold to destroy loco weed. This product must be injected into the base of each plant, and, according to one experiment upon which I have data, it is very efficient, at a cost of 40 cents an acre and labor. To be ultimately successful the problem of eradicating loco weed must be coordinated by the Government on a plan similar to that of the Biologic Survey in its rodent extermination campaign, in order to clear the range over large areas and prevent reseeding.

In conclusion, I respectfully recommend that this matter be taken up by the proper committee to put the available data in concrete form and present at the next meeting recommendations for the approval of this Association, with the view of requesting some line of action of the United States Department of Agriculture which will provide relief to the suffering livestock industry.

GEORGE M. ROMMEL RESIGNS

George M. Rommel, chief of the Animal Husbandry Division of the Bureau of Animal Industry, who has been with the United States Department of Agriculture for 20 years, has resigned to become editor of an agricultural magazine.

Mr. Rommel built up the Animal Husbandry Division and had done distinguished and effective work that is recognized throughout the country as well as in the department. A native of Iowa, he is a graduate of the agricultural school of the Iowa State College at Ames. He is the author of various bulletins and articles on animal husbandry topics, a fellow of the American Association for the Advancement of Science, and secretary of the American Genetic Association.

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[1] Farmers' Bulletin 1054 recommends severing the root below the crown of buds and states that it is not necessary to dig out the whole root.—EDITOR.

THE NEED OF COOPERATION BETWEEN THE UNITED STATES AND MEXICO FOR THE CONTROL OF EPIZOOTICS [1]

By L. SANTA MARIA

Veterinary Inspector, Department of Public Health of the Republic of Mexico, Piedras Negras, Mexico

IT IS with great difficulty that I undertake to prepare a paper in the English language, as I lack experience in its use; but I undertake to do so feeling sure that you will pardon mistakes which are unavoidable.

Before entering into my subject I will take this opportunity to assure you that I bring the most cordial greetings from the veterinarians of Mexico to the members of this Association. The veterinarians of Mexico are fully aware of the great advances made in veterinary science by the members of the profession in the United States. We have watched them in their successful efforts in the control of infectious diseases of animals; we are acquainted with the wisdom of your laws relating to the movement of livestock, the regulations governing the inspection of meat, milk and other articles of food, the organization of your Army veterinary service, your enormous progress in biologic therapy, etc. The names of the leading veterinarians in this country are familiar to us, and we have obtained and used to our great advantage their books and articles.

Cordial relations between the veterinarians of our countries have never been initiated, on account of the revolutionary conditions which have kept our country in a turmoil of successive bad governments, which have prevented all constructive progress. By good fortune, Mexico has at present a strong, honorable government, in the leadership of which we have General Obregon, a man of energy, honor and good intentions, who has been able to establish peace and to give new life to the wheels of industry by providing full protection of life and capital to both the native and the foreigner.

As a citizen of Mexico, a country desiring the friendship of the United States, in spite of the statements to the contrary by

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

certain sections of the press of this country; as a veterinarian of Mexico, and as a representative of the Department of Public Health of Mexico, I wish to express my best wishes for the progress of this Association, and urge a more sympathetic understanding on which to build for our mutual benefit.

It is a well known fact that the transportation of livestock from one locality to another, or some of their products like hides, horse hair, bones, etc., constitutes one of the most frequent and dangerous causes of epizootic disease propagation in livestock. There is not one veterinarian that has not had the opportunity of seeing some cases of infectious and contagious diseases which have developed in some locality coinciding with the arrival of livestock from other localities. Epizootic diseases are of daily occurrence in livestock shows, fairs and expositions. In this way we could cite a multitude of examples to demonstrate the truth of what I have said.

The sanitary authorities of the civilized countries have always understood these facts clearly, and to that effect they have dictated a series of laws tending to regulate the transportation of livestock, thereby eliminating a serious danger. The sanitary departments of the different States of the Union of America have in this respect a great many sanitary laws which, without doubt, are the most complete of their kind. I wish to express my admiration for such laws, of which the United States should be proud.

Contrary to what is supposed, the international interchange of livestock between the United States and Mexico has not been given its due importance from the sanitary point of view. The geographical location of the two countries makes possible between them a development of an active commercial interchange of all kinds of articles, livestock not excepted. Such interchange will be increased as a natural result of greater activities; therefore this is a good opportunity to point out the necessity of initiating measures to make more efficient the sanitary inspection of animals and their products not elaborated in the border of the United States and Mexico, an inspection which up to date has not been as strict as it should be.

For example, I have seen hundreds of freight cars, loaded with hides, crossing the boundary to be interned in the United States, the origin of which nobody knew, and that perhaps came from regions infected by anthrax or by some other contagious

disease, without any more requirement than a statement from the merchant before the American consul that the hides came from regions which were not infected by any infectious or contagious disease. It is easy to understand that such a requirement is useless, because in the majority of cases the interested party in this line of business has not the least idea of what he is stating, doing it only to obtain the permit he is after, without knowing the great danger such a statement engenders in this class of affairs. In such case the veterinary inspectors of the Mexican Government could have given good service by demanding information in detail, and when that was not obtainable, by arranging under their vigilance the disinfection of the hides. Never have they been asked for their cooperation in such a way.

In the same way I have known of animals that have been declared tuberculous in the United States and have been sent into Mexico by some unscrupulous individuals taking advantage of the fact that some places on the Mexican border are in need of veterinary inspectors, or defying criminally the vigilance of the authorities. In cases like this the American authorities would have helped greatly by prohibiting the exportation of such animals.

To the high criterion of this assembly I have undoubtedly referred sufficient cases to understand the imperious necessity of correcting such deficiencies, which can be brought about only by an understanding between the sanitary authorities of the United States and Mexico. The understanding, if realized, would be beneficial. It would eliminate such dangerous causes of contagious disease propagation, and greatly facilitate its control.

It would be very difficult for me to submit to you any set of rules, which necessarily will have to be formed if an understanding is to be reached between the two countries. Neither do I consider this an opportune time to discuss such a document. I wish, nevertheless, to point out very briefly a few things which, owing to my experience as veterinary inspector on the border, I think should be taken up first.

It would first of all be indispensable to establish that every person or corporation desiring to export livestock or their products from Mexico or the United States should be required to secure a permit or health certificate from the sanitary authorities. It would then be possible to prevent the transpor-

tation of livestock or their products from districts in which infectious diseases exist. It would be possible to impose a multitude of highly beneficial measures, such as prohibiting all classes of commercial interchange of animals that have been declared tuberculous; to require that all bovine animals intended for breeding when proceeding from a tick-infested zone, should be dipped previously in an arsenical solution; to arrange that hogs before being transported should be vaccinated against hog cholera, and other things that will contribute to lessening the danger, from the hygienic point of view, of the transportation of animals.

To my knowledge, the carrying out of such measures as I have briefly mentioned will result beneficially to the livestock industry and to those who are interested in it. When the interested parties in this line of business of Mexico, as well as those of the United States, are convinced that the interchange of animals or their products does not offer any danger from the sanitary point of view, because it is subjected to a rigid scientific examination, they will increase it. It would be useless to try to demonstrate all the advantages that will come with this intensification of commercial activities. It presents to the doctors of veterinary medicine a new opportunity to realize a work of positive utility. I am sure that I have made myself understood, although my paper is a little confusing, and if my propositions are taken into consideration and practiced we will have contributed to the already existing idea in society that the mission that has been recommended to us professionally is transcendental.

It may be of further interest to this Association to know that during the months of May, June and July, 1921, approximately 38,000 head of cattle, goats, sheep and hogs crossed the international boundary at Eagle Pass, Texas, into Mexico, this being the third in size of entries into Mexico from the United States.

As a heritage of the war, dourine has appeared in Belgium and in the northeastern part of France, where it is said to have been introduced by German army horses. A recent Belgian official report states that the disease has been found in 4 stallions and 88 mares and that 277 other animals are suspected of being infected.

COOPERATION IN THE ERADICATION OF TUBERCULOSIS [1]

By H. R. SMITH

Live Stock Commissioner, National Live Stock Exchange, Chicago, Illinois

THE INCREASE in the prevalence of bovine tuberculosis throughout the United States during recent years is a matter of grave concern. According to the records of the Department of Agriculture, a total of 35,113,077 hogs were slaughtered under Federal meat inspection during the fiscal year 1908, of which number 719,279, or 2 per cent, were "retained" for tuberculosis. Since 1908 the percentage found to be infected with this disease has increased an average of nearly 1 per cent each year. Of the 37,700,000 hogs slaughtered under Federal inspection during the fiscal year ending June 30, 1921, 12.5 per cent were retained for tuberculosis. It is reasonable to assume that the 40 per cent of the hogs of this country not slaughtered under Federal inspection are equally affected, and we are safe in saying that on the average one out of every eight hogs in the United States has tuberculosis.

Fortunately, hogs are for the most part killed young, before the disease has become generalized, and but 1 per cent of the total killed are wholly condemned for grease or sterilization. At the Chicago market alone the loss last year was 54,325 hogs, a train load of 30 cars per week nearly worthless. Moreover, as a large portion of the heads are condemned when the carcass passes inspection, the loss is only partially indicated by the number sterilized and condemned.

Dr. Schroeder of the United States Bureau of Animal Industry estimates that at least 95 per cent of the tuberculosis in hogs comes from cattle. Since 1917, when the nation-wide campaign for the eradication of tuberculosis in cattle was organized, there has been a material reduction in the percentage of cattle retained for tuberculosis at our market centers—approximately one-sixth less now than then. On the contrary, the percentage of hogs retained was 9.8 per cent in 1917 and 12.5 per

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

cent in 1921, or one-fourth more. This cannot be explained by the fact that much more milk was sent to condenseries during our participation in the World War. The increase in the prevalence of tuberculosis among hogs was even greater preceding that period.

I have wondered if the appalling conditions with respect to the great increase of tuberculosis among poultry during recent years may not be largely responsible for the higher percentage of hogs retained for this disease. Many chickens are now dying from tuberculosis, and these are very commonly eaten by hogs. While avian tuberculosis may be less readily transmitted to hogs and does not produce generalized cases, it does cause localized lesions, as stated in the final report of the Royal Commission of Great Britain appointed to inquire into the relations of human and animal tuberculosis. Cultures taken from 59 pigs showed that 50 were of the bovine type, 3 human, 5 avian, and one mixed avian and bovine: Nine of the generalized cases of tuberculosis in these pigs showed the avian type except one which was mixed avian and bovine. Whether or not poultry is responsible for much of the tuberculosis in hogs, the fact that so many chickens are dying from this disease would seem to warrant the making of some systematic effort to reduce it in poultry.

The organization of our Federal and State accredited herd plan for testing cattle has been remarkable considering the short time in which it has been done. The success of this great American enterprise has been watched by sanitarians of other nations and they have marveled at the results thus far accomplished. We now have over 80,000 herds of cattle under Federal and State supervision, 60,000 that have passed one clean test, and nearly 10,000 fully accredited. This is a wonderful showing for the three-year initial period. It has been made possible through the splendid co-operation of breeders, veterinarians, market men, members of Congress and State legislators, with the intelligent leadership of the United States Bureau of Animal Industry. However, we have made but a relatively small beginning in a tremendous undertaking. If we are to hold this menace in check and eventually eliminate it, still greater efforts must be put forth in the future. Starting with a Congressional appropriation of $500,000 three years ago, we now have $2,000,000. State funds for tuberculosis eradication

totaled less than a half million four years ago. We have now State funds amounting to $4,000,000 for one year's work. Notwithstanding this great increase in Federal and State appropriations, the demand for the testing far exceeds the means by which it can be done. Two months of this fiscal year are gone, and some States have already found it necessary to put on the brakes because of fast-depleting Federal or State funds. The Federal indemnity apportionment will be exhausted first because the States have exceeded the Federal appropriations. Fortunately, Congress will be in session, and there is reason to believe that in view of the importance of this work a willingness will again be shown to grant an emergency appropriation, especially when the members of Congress hear from their constituents on this subject. It is a gross waste of our national wealth to permit an annual loss of thirty millions of dollars when an expenditure of ten millions each year will in a short time eliminate 95 per cent of this burden to our nation.

Of infinitely greater importance is the fact that the elimination of tuberculosis in cattle may reduce human tuberculosis 50 per cent. It would be a crime not to permit this work to go forward still more rapidly. There is a strong disposition on the part of Congress to economize on public expenditures, which is a very commendable thing; but if intelligent consideration is given to these numerous requests and if the wishes of the people are heeded, a liberal increase in the appropriation for tuberculosis eradication will be granted.

In this connection I wish to say that the members of Congress are more disposed to grant appropriations for indemnity than for salaries. If the work of eradication is to grow in keeping with popular demands, the counties must assume a share of the operating expense. Many counties have already raised funds for the employment of veterinarians whose work will be supervised by Federal and State officials. This is a most favorable indication. It means thorough work with the county as a unit, and it means the beginning of the end of tuberculosis in the counties which undertake it. With the intrademic test, area work preceded by an educational campaign is giving remarkable results. The success of this work is very largely a matter of education. When the people understand the importance of tuberculosis eradication and the simple methods by which results can be accomplished, they invariably want their herds

tested and the reactors properly disposed of. The county agents are now taking a keen interest in this subject, and they are in a position to create public sentiment that will make the enterprise succeed in any community. The boards of supervisors in four Michigan counties—Hillsdale, Livingston, Jackson and Wayne—have appropriated sums ranging from $3,000 to $5,000 each for county co-operation in the eradication of tuberculosis. The farm bureaus of seven counties in Illinois have guaranteed funds for this purpose, supplemented in some instances by county appropriations. Iowa county boards have no authority to make such appropriations, but the farm bureaus of Winnebago and Shelby counties have each recently guaranteed $4,000 for the employment of veterinarians for testing herds, this sum in the former county to be raised by a charge of 25 cents per head on each animal tested. The herds of four counties in Wisconsin—Barron, Lincoln, Door and Waukesha—have been nearly all tested, and the work has been started in other counties. The farm bureaus in a large number of counties in New York and Nebraska have financed this work, which is already giving excellent results.

Public opinion is our greatest power, and whenever the people of any community are aroused to the importance of an undertaking and are willing to support it financially and otherwise, the problem is solved. This is particularly true of a condition that menaces human health. At Paris, Ill., where recently the five children which drank milk from a tuberculous cow in the Kelly family of seven contracted tuberculosis, every owner now wishes his herd tested, and the veterinarians employed by Edgar County tested all of the breeding cattle in the first township in three weeks. The film "Out of the Shadows," which pictorially describes a similar case that came under the observation of Dr. Gibson, a Federal inspector, is a wonderful help in bringing this subject to the attention of the people of any community. We have four of these reels in constant use by county agents and have also loaned a portable moving-picture machine that can be used in any church, schoolhouse or outdoor meeting by use of a storage battery or electric lighting system. Just as soon as the people of any county vote money for an enterprise of this kind you may be assured that the representatives of such counties in Congress and in the State legislatures will favor adequate appropriations. With such

support and with the whole-hearted co-operation of farmers, breeders, Federal and State veterinarians, private practitioners, market men and others we may expect still greater results in the next four years. The National Live Stock Exchange and member exchanges, in full realization of the importance of this great undertaking, have recently gone on record as favoring aggressive work in the eradication of tuberculosis, and they will give you, whose efforts are greatly appreciated, every possible assistance leading to the success of the enterprise.

MANY CATTLE BREEDERS WANT TO HAVE HERDS ACCREDITED

The work of ridding the country of bovine tuberculosis through the accredited-herd system, which is based upon Federal supervision, and the issuance of certificates by the U. S. Department of Agriculture, is making steady progress throughout the country. The State of Minnesota has been leading for some time in the number of fully accredited herds and the number of cattle certified free of the disease, but the report for September shows that the lead has gone to Wisconsin. The latter State now has 1,309 accredited herds, containing 29,001 head of cattle. Minnesota has 1,171 accredited herds, with 28,089 cattle.

The total number of herds accredited in the United States is 9,963. The number of cattle in the country certified free of the disease is 230,704. There are 71,999 herds and 848,244 head of cattle that have been tested once and, presumably, will subsequently be on the accredited list. There are 1,546,814 cattle in 103,046 herds now under Federal supervision.

The demand for inspections and tests under this tuberculosis clean-up plan is so great that the inspectors can not keep up. At present there are 15,671 herds on the waiting list. These herds contain nearly a quarter of a million cattle. During September 163,742 cattle were tested in the various States. Of these, 6,093, or 3.7 per cent, reacted.

"A very hot bath will often destroy the germs of influenza," states a weekly journal. The difficulty, of course, is to persuade them to have one.—*London Punch.*

THE VETERINARIAN AND THE PUBLIC [1]

By A. N. CARROLL

Pueblo, Colo.

THE VETERINARY PROFESSION today is occupying a position in the eyes of the public far beyond the fondest hopes of some few decades ago. With the increased confidence and respect shown the profession come many new and complicated problems and the necessity for our higher attainment individually and collectively.

There are certain definite facts recorded in which we are legally responsible to our clients. There are far more vital obligations to which we are morally responsible to ourselves and the public, if we are to advance as we now have the opportunity. The public is daily expecting more from the profession, and it is essential that we arise to these possibilities.

Our advancement is in direct ratio to increased confidence by the public in every individual among us, but more especially of our activities as an Association. Individually our efforts are too often lost, but collectively they are intensified and perpetuated, exerting an influence a hundredfold more than each by itself. A half dozen men bonded together can exert far more influence than a half hundred without team work.

We are living in the day of organization, which is manifested in every walk of life. The old adage that competition is the life of trade is obsolete. The present-day organization is regulating competition within itself and universally working to the advantage of the group, eliminating internal friction and by a united effort developing not only the whole but the units as well. Modern competition within a profession no longer means a state of war with victory manifested upon defeat of the contemporary, but a broader view, bonding the individual to a mutual helpfulness, strengthening his fortifications by developing his profession, that he himself may have the approval of public opinion in relation to other professions.

Much has been accomplished by this Association in the past, but much more is demanded of it in the future in shaping the

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course and leading the way to our progress. It has never, however, accomplished what it could have with a stronger organization working with a united thought, eliminating jealousies and destructive competition between individuals and above all between groups within our Association.

Why have we continued fighting among individuals, when by lessening the estimation of the other by the public, we lessen the estimation of the profession of which we are a part, and for which we suffer? Why have we failed to develop a proper good-fellowship among the different sections of our organization, so necessary to harmony? Each one has its course to pursue with the utmost credit to itself, but forever with the broader view of advancing the profession as a whole. What we need is not less of some sections, but more of all sections.

We, like other professions, are gradually specializing, which will call for further subdivision of classifications; but no matter how specific, they are all co-relative, one upon the other. In the same sense, all State associations should be part of our National Association, having official representation within, and all working as one unit with a common view.

We must devote more of our time to putting the house in order, getting into the game without further delay, that we will not be discriminated against by stronger influences. Many branches of our profession are looked upon favorably by other interests, and we stand to lose, unless we awaken, for they are better organized. At present the public is with us, and our organization can not fail, except from within, for we are founded upon correct principles, that of our own advancement without hindrance to others. We are constructive and not destructive. The stronger we become individually and collectively, the greater good we accomplish.

So let us all put our shoulder to the wheel, enlisting the support of every one, eliminating all obstacles from within, and develop a unity capable of attaining our objectives.

When we have unity within ourselves, and labor with unselfish energy for us all, no one in particular, but every one in general, we will be coming into our own, convincing the public of what we desire, and they willing to concede to the veterinarian.

MUNICIPAL FOOD INSPECTION [1]

By GEORGE H. GLOVER

Dean, Veterinary Department, State Agricultural College, Fort Collins, Colorado

THERE APPEARS to be a growing interest in municipal food inspection. This interest is more generally apparent with the citizenry than it is with the veterinary profession. Relatively speaking, public health is no less important in the small cities and towns than it is in the large cities, and should be equally safeguarded.

There is little need of presenting arguments to you men in favor of municipal food inspection, and this I shall not attempt to do further than to make a few general observations. The fact of its need is generally admitted, but apathy stifles concerted action, and nothing is done. Public sentiment has long since been created in favor of a pure water supply, and it is considered the thing of first importance in municipal affairs. As inconsistent as it may seem, yet the fact remains, that the public is much more concerned about what it shall drink than it is about what it shall eat. From both an esthetic and a public health standpoint, there is no just ground for such discrimination. Measures that safeguard health should invariably receive first consideration. Paved streets, a public library and electric lights represent conveniences that can not be gainsaid, but nevertheless should always be secondary in consideration to public health measures. We can have just as many public conveniences as the taxpayers will stand for, and it is also true that we can have as much public health as we are willing to pay for.

Granting that municipal food inspection is desirable, then its practicability constitutes the main question for argument. I shall contend that it is feasible for towns ranging in population from 1,000 to 10,000 as well as for the larger cities.

Federal and State authorities are without jurisdiction, save in a very general way. Local conditions are so variable that the use of a standard ordinance is impossible. Each city or town

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must work out its own problem. There are really no insurmountable difficulties to overcome when the people are made to appreciate the importance of an equal and adequate supervision of both the food and water supply.

The veterinarian, because of his training, is the logical person to serve as food inspector, and if inspection is to be inaugurated in the small cities and towns, he apparently is the one that must assume leadership. This he naturally hesitates to do, for his efforts are liable to be attributed to selfish motives, and there is usually little promise of substantial financial returns for his efforts. His work as inspector would necessarily interfere somewhat with his practice and might create some enemies. However, we have a parallel case in the city and county physicians, and with them these objections are found to have small significance.

The success or failure of an enterprise of this kind, after it has once been started, depends much upon the judgment and tact of the inspector. It seems reasonable that a veterinarian as food inspector might grow in popularity and enjoy a commensurate financial return from his practice.

Municipal food inspection should be conducted as an educational propaganda, seeking cooperation in making conditions better. Ideal conditions can never be obtained, and the best that can be hoped for is a marked improvement from month to month. A too vigorous use of authority invariably creates an opposition that stifles cooperation and may be fatal to the enterprise. Utopia can not be reached by one jump. In this respect food inspection differs from some other things, such, for instance, as regulating automobile traffic on the streets. The most grievous violations of the ordinance should be corrected at once, but improved methods are matters of education and habit. You can no more legislate a dirty dairyman to be cleanly in his habits than you can legislate a sinner into godliness.

There is another aspect of this question which should be emphasized. The veterinary medical profession must broaden its scope of usefulness. It must do more or it will be required to do less. Municipal food inspection provides a larger opportunity for public service. Upon final analysis, service is inevitably the standard of a just appreciation as well as an adequate remuneration. The work of the veterinary profession consists

essentially in conservation of the animal wealth and as guardian of the public health. We must admit that up to this time our efforts in guarding the public health have not been especially conspicuous.

In every department of human activity the law of supply and demand operates impartially and unceasingly. The demand is determined by the supply and the need for that particular kind of service. The supply depends upon many factors, including remuneration. The most important factor in remuneration is the quality of service rendered. There is a difference between earning a living and getting a living. If the veterinarian is to sell his services profitably he must make them not merely passively appreciated but they must be made very necessary to the community. His motto should be "How can I best serve my community?" and not "How much is there in it?" "The laborer is worthy of his hire," but the one who is most concerned about the amount of his wage is shortest on the job. The spirit of commercialism seems to dominate most things these days and the learned professions have not escaped its blighting influence. Good citizenship has its responsibilities which are public as well as private. Our observation has been that the veterinarian who takes an interest in public enterprises, such as the county fair, the commercial club, public health problems, is the one who usually makes his location permanent and who finds his profession worth while.

The detail of food inspection can be worked out in any town that is large enough to support a veterinary practitioner. There are no obstacles that can not be surmounted; the most formidable is a dormant public interest. Here is an opportunity for a larger field of usefulness, and every veterinarian is urged to take the matter under advisement.

Having been in charge of food inspection in the City of Fort Collins for more than fourteen years, the writer feels warranted in speaking with a certain degree of assurance. This work, taken on as an avocation, has been interesting. Experimentally, financially, professionally, and as a public health measure, it has been much worth while. The real problem in all cases is how to get the work started. In Fort Collins the first step was a membership in the Chamber of Commerce. The subject was presented in a brief address before the Chamber of Commerce and the women's clubs, where favorable resolutions were sought

and obtained. A conference with the meat men, dairymen and city council was arranged. An opposition arose, as was to be expected, but it proved not to be formidable. A tentative ordinance was presented, which was redrafted by the city attorney, and after some delay received favorable action.

The first ordinance provided for license fees which were presumed to cover the expense of inspection. It provided for the employment of an inspector, who should be a qualified veterinarian and receive a salary of $75 per month. If looked at from a purely mercenary standpoint, the salary offered was wholly inadequate, considering the manifold duties provided for in the ordinance. However, it was an opportunity; it was getting the work started.

Supervision of foods of all kinds came under the provision of this act. There were two questionable abattoirs and several dealers who made a business of slaughtering more or less decrepit animals in the country and supplying the city markets with dressed meats.

The first tuberculin test of cows in the milk supply of the city revealed about 7 per cent of reactors. During the first year of inspection over a ton of meats was condemned on the average each month. At this time about 80 per cent of meats consumed in the city were slaughtered locally. Now the ratio is reversed and approximately 80 per cent of meats sold over the block is imported, bearing the Government stamp of inspection.

After fourteen years of testing, and the slaughter of reactors, tuberculosis has been practically eliminated from the dairies and the private cows of the city. No reactors were found on the annual test which has just been completed. Commensurate with this has been the reduction in condemnations for all diseases, including tuberculosis, at the city abattoirs. No tuberculous lesions have been found during the last twelve months, save in one shipment from Denver. All license fees have been abolished. It was considered that food inspection is for the benefit of all the people and should be paid for out of the public treasury. The food inspector and his deputy do practically all of testing of cows and of milk without extra charge. The intradermal test is used with various combination of tests on suspicious cases.

The dairies, meat markets and provision houses are visited

at uncertain intervals and the slaughterhouses once a day. For this service the city now pays $115 per month. If one is to consider nothing but the salary, the remuneration is small indeed. However, when looked upon as an avocation, as an adjunct to an established practice or salaried position, it is not to be ignored. Furthermore, the time devoted to inspection scarcely exceeds an average of two hours a day. With the additional income from food inspection, many places that now can not support a veterinarian would be able to do so, and the community would enjoy the benefits of both inspection and a trained veterinarian.

Supervision of foods will eventually be extended to all cities, large or small, and to a certain extent to the rural districts. Public health is paramount. It is simply a matter of rousing the public from its lethargy and creating the right sentiment. It is a work that the veterinary profession can appropriately sponsor and support with its every effort.

MEXICAN REPRESENTATIVES IN FORT WORTH

Special representatives of President Obregon of Mexico, who are in Texas studying the live stock conditions, were guests of the Bureau of Animal Industry and Live Stock Sanitary Commission in October.

Dr. Carlos Pavia, head of the veterinary college in Mexico City, and Samuel Torres Elorduy, famous hydraulic and agricultural engineer of Mexico, were highly pleased with the manner in which the cattle and other live stock are handled at the Fort Worth stockyards.

Elorduy, who has spent much time in the United States studying conditions, and who, with Dr. Pavia, is in the State in the interest of the Mexican department of agriculture, declared that Fort Worth has one of the most splendid systems of handling cattle that they have seen.

Mexico intends starting a vigorous campaign toward tick eradication next year, and Dr. Pavia will leave for Washington as soon as the Dallas fair is over to consult with higher officials in the Bureau of Animal Industry in further details of this branch of work, which is new in the sister republic.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

ANTHRAX IN TWO DOGS, TREATED WITH SERUM

By CHARLES V. NOBACK

Laboratory of Hygiene, Bogota, Colombia

A NATIVE had a cow which he kept for his family use. He took such care of her as to be very careful of the water she drank, giving her water from a reservoir instead of allowing her to drink from the common brook. She was pastured on land near the owner's house. One day during the dry season the cow and her calf were taken to another pasture, which lies in a valley receiving the waste water of a small town and an abattoir and is known to be contaminated with anthrax.

History.—On Saturday, February 19, 1921, about ten days after being on the new pasture, the cow suddenly gave less milk than usual, dropping from 12 quarts daily to less than 6, at the same time refusing to eat or drink. The next day at 4 o'clock in the morning she had a painful attack of colic with tenesmus, passing some soft feces and blood. At 5 o'clock the same morning the animal died very suddenly without struggling. The carcass was left on the ground until the next day, when a local native practitioner was called to make an autopsy. According to the owner, the carcass was greatly swollen, anus protruding and congested, with black, tarry blood exuding from the anus, eyes and nose. The carcass was unnecessarily opened, two dogs and a kitten eating some of the blood and meat. Four days later the owner came to the veterinary clinic with the dogs for treatment, giving the foregoing history.

Symptoms and Treatment.—The dogs appeared as if they had been inflated with air. There was a marked edematous swelling over the entire body, especially over the submaxillary, pharyngeal and brisket regions, together with a stomatitis and swelling of the mucous membranes of the mouth. The swelling was soft and doughy on pressure, characteristic of anthrax. The temperatures were 41° and 40° C. respectively. The dogs were

of a fox terrier type. One was white and the other black and brown. The white one was very weak, with respirations increased, eyes congested, hardly able to walk, and seemed about ready to die. At half past eight in the morning each dog was given 20 mils of anthrax serum subcutaneously. They were quarantined and kept under observation. During the afternoon they seemed a little better; nevertheless each was given 30 mils of serum again at half past four. The temperatures and other developments are shown in the accompanying tables.

TABLE 1.—WHITE DOG.

Date 1921	Temperature (Centigrade)			Remarks
	9 a.m.	12 m.	6 p.m.	
Feb. 25	41.0	40.6	40.0	20 mils serum at 8 a.m. 30 mils serum at 4:30 p.m.
26	39.5	40.0	39.5	Polyuria.
27	38.8	39.4	39.9	Polyuria.
28	39.5	39.8	39.6	Marked increase in edema; difficulty in respiration; very weak. Thinking that animal might die, administered 50 mils of serum subcutaneously at 6:30 p.m.
Mar. 1	40.5	40.0	39.5	Difficulty in swallowing.
2	39.5	39.0	38.5	Seems easier.
3	38.8	38.0	37.6	Edema much reduced; eats better.
4	38.9	38.0	37.6	Apparently well; facial expression normal.

The polyuria was very likely due to the edema.

TABLE 2.—BLACK AND BROWN DOG.

Date 1921	Temperature (Centigrade)			Remarks
	9 a.m.	12 m.	6 p.m.	
Feb. 25	40.6	40.0	40.2	20 mils serum at 8:30 a.m. 30 mils serum at 4:30 p.m.
26	39.0	39.0	39.0	
27	38.5	38.4	38.5	Swelling reduced. Chews food well and swallows more easily.
28	38.2	38.5	38.4	
Mar. 1	38.0	38.3	38.5	
2	38.0	38.2	38.0	
3	38.0	38.0	38.2	Apparently well.
4	38.2	38.2	38.0	Discharged.

The diet during the course of treatment consisted of milk in the morning, a little meat broth at noon, a few scraps of meat in the afternoon, with all the water they desired.

The avenue of infection was apparently through the abraded mucous membranes of the mouth, since the lesions were of the pharyngeal type and no digestive disturbances were present. The feces were normal, no blood being present.

It seems apparent that the white dog would have died if he had not been treated with serum. In the case of the black and

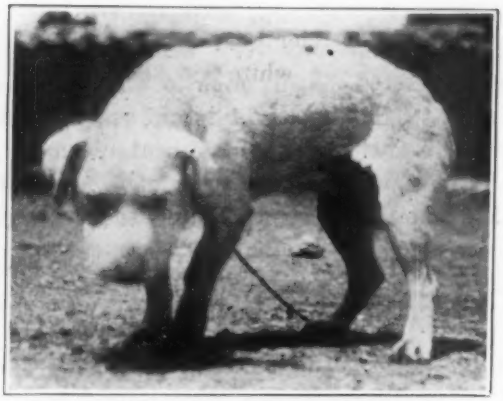


Fig. 1.—White Dog Affected with Anthrax

Fig. 2.—Black and Brown Dog Affected with Anthrax

brown dog there is the possibility that he might have recovered spontaneously, because he was not so severely affected as the white one.

At the same time that the dogs were brought to the clinic for treatment the owner mentioned that a kitten two months old also ate some of the meat with the dogs. The kitten died the same morning that the dogs were brought for treatment. On request the owner brought the dead kitten to the veterinary clinic for autopsy. The following was found: Eyes open; abdomen slightly distended; black, tarry blood oozing from the nose, mouth and anus. On opening, the lungs were found to

be congested and dark, spleen enlarged, intestines congested and dark. Under aseptic precautions some of the heart blood was withdrawn in a sterile pipette, and on microscopic examination motile rods resembling anthrax bacilli were seen. An agar slant was made, which gave the characteristic anthrax growth, a waxy, spreading growth. A guinea-pig was inoculated and died two days later (36 hours) of typical anthrax.

SOME PARASITES FOUND IN SHEEP ON THE SABANA OF BOGOTA

By CHARLES V. NOBACK

Laboratory of Hygiene, Bogota, Colombia

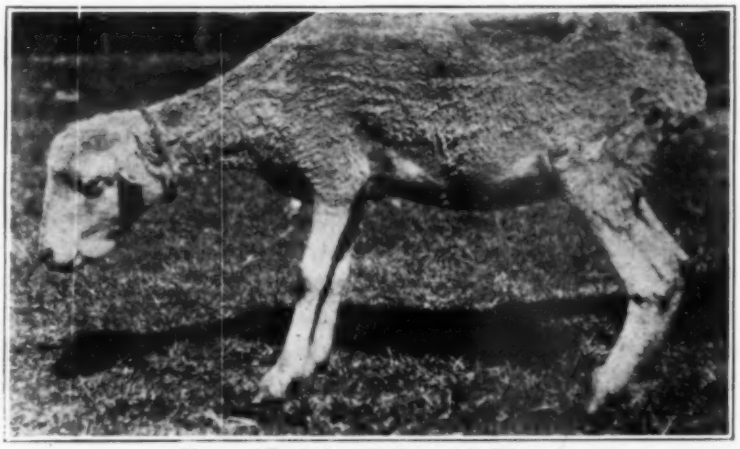
THE Sabana of Bogotá is situated in the Eastern Cordilleras of the Andes Mountains and is about 100 miles long by 30 to 60 miles wide. It is connected by mountain passes with other sabanas in this mountain chain. Like other sabanas in this region, it is a mature valley, having the slow-moving ox-bow Bogotá River running throughout its entire length. This stream finally finds its way to the upper sources of the Amazon River. The land is very fertile. The climate is mild, something like spring in the State of New York. These physical conditions are naturally favorable for the development of parasites, especially in the wet season. These sabanas are over 8,000 feet above sea level and demonstrate that altitude alone is not an important factor in the prevention of parasitic infestations, as will be seen from the report that follows.

Although sheep were first brought here about 400 years ago by the Spanish settlers, the sheep industry, properly speaking, is only beginning to be developed at the present time for the purpose of raising wool for the making of woolen goods for domestic use. There are two large establishments in Bogotá which manufacture woolen goods, and it is necessary to have the wool of at least 35,000 sheep annually to keep them going economically. At present wool must be imported, but on account of the expense of transportation (even with the prevailing low prices of wool in England) it would be cheaper to raise sheep for wool on the sabana. There are about 10,000 sheep in this region at present, including about 500 purebred

animals—Dorsets, Rambouillets and Merinos from France; Southdowns, Lincolns, Shropshires and Romney Marsh from England; and a few of various breeds from Uruguay and the United States; however, France and England are the favored countries from which domestic animals are imported.

There is a parasitic condition found in the sheep of this region known as "anemia tropical," "paperas" or "lombrices," according to the most prominent symptom present. Pale mucous membranes, a marked edema, especially in the submaxillary region (paperas), emaciation, dark fetid diarrhea and toward the end pronounced weakness followed by death, are among the principal symptoms. Lombrices refers, popularly speaking, to the diarrhea, but literally means worms. The appetite is good until a few days before death. The disease is attributed to the small liver fluke (*Fasciola lanceolata*), popularly known as mariposa, but in all sheep autopsied comparatively few flukes were found, and not in sufficient number to explain the marked symptoms.

An examination of the feces on September 30, 1920, showed the presence of the eggs of *Strongylus* (*Haemonchus*) *contortus*. On postmortem, October 1, after slaughtering an advanced case, a congestion of the mucous membranes of the abomasum and duodenum, together with a catarrhal inflammation, were found. The stomach contents consisted of a dirty brownish liquid, in which were seen a large number of stomach worms, some swimming about freely in the fluid and some



Sheep Affected with Stomach Worms

attached to the stomach walls. They were also found in a similar way in the duodenum throughout half its length. The female is about an inch in length and the male one-half to two-thirds of an inch. They agree with the description given by Dr. B. H. Ransom for the stomach worm of sheep (*Haemonchus contortus*) in the *Cornell Veterinarian* of April, 1920.

Treatment.—The 1 per cent copper sulphate aqueous solution, as first used successfully by Thieler in South Africa and recommended by Ransom, was tried. The following doses were used: For lambs 3 months to 9 months old, 20 to 50 mils; sheep over 1 year of age, 60 to 100 mils. All animals treated were fasted from 18 to 24 hours before they were given the treatment. The treatment was repeated twice at an interval of three weeks. Four flocks of sheep were treated, with a total of 2,000 sheep. In three of the flocks the results were excellent, the disease cleared up, the animals gained weight rapidly, and in some of the advanced cases the edema of the jaw passed away.

The fourth flock treated was located on an adjoining sabana about 60 miles away, and in spite of the treatment the sheep kept on dying at the same rate and showed the same symptoms after treatment as before treatment. An effort was made to find out the reason for the failure of the treatment by looking for the encysted stomach worm, *Strongylus* (*Ostertagia*) *ostertagi*. On autopsy the lining of the fourth stomach (abomasum) was found to be studded with raised white swellings about the size of a pinhead to a small pea; the wall of the stomach was twice as thick as normally and a straw-colored exudate was present in the walls and in the abdomen. The encysted stomach worm was found in the raised swellings. *Strongylus* (*Haemonchus*) *contortus* also present in large numbers. It was recommended that the visibly affected sheep be slaughtered and that the pasture be changed to a dryer region. This is being carried out, and it is too early as yet to make any statement as to the result.

Some bladder worms, *Monieza alba,* were found in a few imported sheep which had died from other causes (in transit). No cases of *Œsophagostoma columbianum* (nodular disease) in the intestines were found.

The only external parasite found was the common sheep tick.

GRANULOMA OF THE FROG IN THE HORSE

By ERNEST F. JARDINE

Government Veterinary Surgeon, St. Kitts, British West Indies

THERE is a condition here, seen most frequently in mules, but occasionally in horses, in which the horn of the frog disappears entirely leaving bare the sensitive structures, which naturally, from constant friction with the earth, irritates the parts causing exuberant granulations accompanied with lameness. On the other hand, and these are the most frequent, from the excessive height of the wall, the hoof becomes contracted; but this contraction is seldom accompanied with lameness, and but for the condition of the frog, which becomes injured from sharp stones on the road, the animals could continue at work. The condition has a certain resemblance to canker, with the exception that it has no tendency to involve or encroach upon the sole; and the rapidity with which the condition responds to treatment. I am frequently puzzled as to how and why it is that even the contour of the frog disappears and leaves a denuded, bleeding surface, sometimes the shape of a marble with a pedicle, and at other times with a sessile base.

I attribute the cause to filth, as it is rarely seen in well kept animals. The continual standing in urine, the ammonia of which macerates and decomposes the horn, will produce it.

Treatment: If the condition is seen in the early stages, it is comparatively simple to treat. Lower the wall, dust parts with calomel and iodoform, alum, copper sulphate in powder, or 50 per cent solution; pine tar on oakum with leather sole to retain in place; all have their sphere of usefulness. In fact, the condition is treated as one would a case of thrush, which is generally the origin of it. When the condition becomes neglected and long standing, when it becomes a sort of tumor, the only cure is extirpation.

If the growth is small, with a well-defined neck and the animal is of a quiet disposition, I usually hook the growth with a tenaculum and with a quick incision excise it; otherwise, the patient is cast, and the growth dissected out.

The wound is covered with boric acid packed with cotton wool and bandaged. The dressing is removed in 24 hours to 48 hours and if there is no formation of pus, it is not washed; otherwise it is, and redressed with boric acid. In about one week's time

the animal is shod, the part protected with tar and oakum and a leather sole, and the animal returned to work.

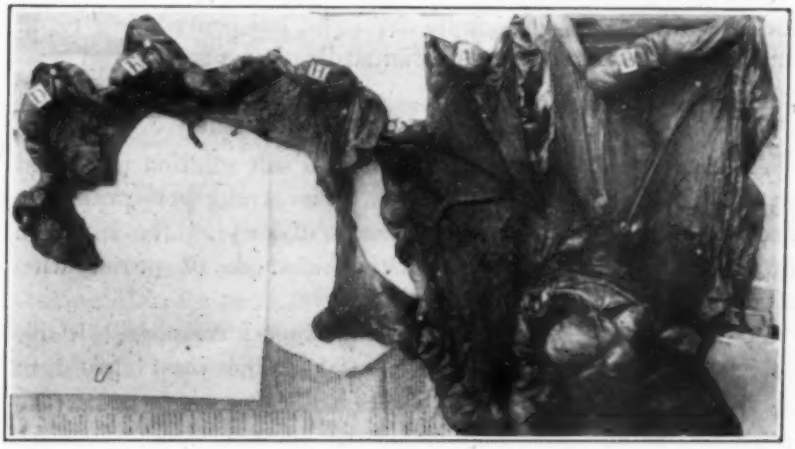
Of course it is understood that everything connected with the operation is done as aseptically as possible.

INTUSSUSCEPTION IN A COLT

By C. A. CARY

Auburn, Ala.

At the Veterinary College clinic of the Alabama Polytechnic Institute, Dr. I. S. McAdory brought in a colt in a moribund condition. This colt was about one week old. No definite diagnosis was made and the colt soon died. Post-mortem examination was made by Dr. N. G. Covington and eight intussusceptions were present in the small intestines. Two of them were displaced by students examining them. The other six are shown in the accompanying photograph.



Intussusception in a Colt

A lady student of the University of Liverpool, England, Miss Edith Gertrude Knight, has been successful in passing with honors the second examination for the degree of Bachelor of Veterinary Science and also the second examination for the diploma of M. R. C. V. S.

ABSTRACTS

A Simple Method for the Determination of the Number of Bacteria in Bacterial Suspensions. K. A. Fries. Centralbl. f. Bakt., Jena, 1921, vol. 86, pp. 90-96.

After reviewing the various methods used for the standardization of bacterial suspensions, the author is of the opinion that the standardization by the counting chamber method has proved most satisfactory, but based upon his own work and also upon Saltmann's extensive investigations carried on in the Hygienic Institute of the University of Berlin, he is of the opinion that if it is desired to count small bacteria, the counting chamber method is very tedious and tiresome for the eyes; besides it also consumes a great deal of time. In the experience of the author the following method which he developed has proved very rapid and most accurate for the standardization of bacterial suspensions.

PREPARATION OF THE STANDARD FLUID

A suspension of yeast in physiological salt solution preserved with 5 per cent phenol is prepared. The strong preservation is necessary on account of the difficulty of keeping the standard fluid in a sterile condition. Other methods of preservation might give equally as good results.

A piece of ordinary yeast (*Saccharomyces cerivisiae*) is dissolved in the phenolized salt solution. The yeast should be fresh, otherwise there is danger that foreign bacteria may be contained in the same and frequently in such great quantities that their presence may later be detrimental for the determination of the number of bacteria in the suspension.

The number of yeast cells in the standard fluid should vary between 20 and 30 million per cc. In order to obtain a suspension of this strength it is as a rule sufficient to dissolve a piece of yeast the size of a hazel nut in one liter of carbolized salt solution. The flasks should also contain approximately 100 small glass beads.

Following the dissolving of the yeast the bottle should be shaken preferably in a shaking apparatus. The shaking should distribute the yeast cells uniformly throughout the fluid. The counting of the yeast cells in the fluid is then undertaken.

For this purpose a Thoma-Zeiss or the Hayem-Nachetsche chamber is preferable. A control counting in both of the chambers is desirable. The results will be more satisfactory if the greatest number of squares are counted in the chamber. In the Thoma-Zeiss apparatus at least 100 squares should be counted; whereas in the other 8 to 10 squares will be sufficient. If the count shows that the number of cells per cc. is of the desired quantity we have a suitable standard fluid. One liter of such fluid is sufficient for about 500 determinations.

Should counting of the standard fluid show a greater number of yeast cells than 20 to 30 million per cc., the fluid should be diluted to the desired quantity; whereas if the number of cells are not present in the required numbers, then either more yeast is added or the suspension is allowed to stand for several days, after which some of the supernatent fluid is decanted, which naturally would increase the number of cells per cc. in the remaining fluid.

On account of the large size of the cells the counting is readily accomplished, which also facilitates a comparative counting of the bacteria in the suspension to be counted.

THE METHOD OF PROCEDURE OF THE BACTERIAL COUNTING

With the aid of the standard fluid the bacterial contents of any suspension can be readily determined. After thoroughly shaking, 0.2 of a cc. is taken from the fluid to be tested with the aid of a pipette and placed into a flask or a reagent glass. Then 2 cc. of the well-shaken standard fluid is added to the bacterial suspension as soon as possible. The mixture is then thoroughly shaken, and with the aid of a Pasteur pipette a small quantity is taken up and quickly dropped upon a clean slide. This is carefully dried over a flame or in the air and the preparation is then carefully stained. Any ordinary stains are satisfactory for this purpose. However, a diluted fuchsin stain is preferable. As a result of the phenol contents in the standard fluid a very good staining is obtained with the fuchsin. After the stain has acted upon the preparation for a short time it is rinsed off and examined under an oil immersion lens. If it is found that the cells are well distributed, as is usually the case if proper care has been taken, the counting may be undertaken. On the other hand, if it is found that the cells are not well distributed, in order to count them accurately the mixture

is diluted with the corresponding quantity of physiological salt solution before the counting slide is prepared. It may also occur that the relation of the yeast cells to the other cells is not such that an accurate counting may be undertaken as, for instance, when the proportion of the bacteria is very much larger than the number of yeast cells. In such cases, of course, this relation may be changed by another mixing, for instance, using a smaller quantity of the bacterial suspension to be examined. Even the beginner will soon find the correct way as to the best procedure. It may be accepted as a rule that by counting with the so-called net-micrometer, the number of organisms can be counted in even a more concentrated form than if the counting is made in consecutive fields. Therefore a rule may be established that for accuracy's sake not less than 250 yeast cells and the corresponding number of bacteria should be counted. Of this number, 250 yeast cells may be found either in 10 different fields or in a greater or smaller number of squares in the net-micrometer, if such is used. If we assume that in counting 10 fields we find 256 yeast cells and 814 bacteria and if of the bacterial suspension 0.2 cc. and of the standard fluid 2 cc. were used the question arises, How many bacteria are present per cc. in the suspension? The desired number is then found according to the following formula:

$$\frac{\text{Volume of Yeast Cells.}}{\text{Volume of Bacteria.}} - \frac{\text{Number of Bacteria. K}}{\text{Number of Yeast Cells.}} = \frac{\text{K} - \text{X}}{}$$

K is the consonant which indicates how many millions of yeast cells are present per cc. in the standard fluid. Thus, if the above figures are placed in this formula and if the contents of the standard fluid is taken as 25 millions per cc. then we have:

$$\frac{2}{0{,}2} = \frac{814}{256} .25 = \text{X} \qquad \text{X} = (795) = 800$$

The number of bacteria in the bacterial suspension therefore was 800 million per cc. In case the first examination of the slides establishes a mixture of too large a concentration in order to make an accurate counting possible, then the mixture can be diluted as stated above. This, however, has no effect whatsoever on the above formula.

The preparation of the standard fluid for counting should proceed rapidly. With this in view immediately after placing

the small drop of the suspension on the center of the counting chamber the cover glass should be slid from the side over the drop. If this operation is not rapidly carried out there is danger that the counts may be erroneous. The best results are obtained if the bacterial-yeast mixture is not of a too high concentration. Also quicker results are obtained if consecutive fields are counted in the place of a number of squares in the Hayem-Nachetsche chamber. The author recommends that in case the bacterial suspension is too concentrated, to take 0.2 cc. of the same and 2 cc. of the yeast suspension and add 5 cc. of water. After this mixture is carefully shaken 6 drops are placed on a slide with the aid of a pipette. After drying and staining of this preparation, the counting is undertaken.

The advantages of this method over Wright's method are that we do not have to depend on the human blood, which in itself must be carefully handled and also is subject to considerable fluctuations. Besides, the standard yeast cell fluid is always ready for use. A. EICHHORN.

REPORT OF THE DEPARTMENT OF VETERINARY SCIENCE. Indiana Sta. Rpt. 1920, pp. 43-47. Abs. in Exp. Sta. Rec., vol. 45 (1921), No. 2, p. 176.

Hog cholera feeding experiments failed to demonstrate the presence of the virus in the urine and feces of hogs having acute cholera. In infection experiments, healthy controls, separated from pigs inoculated with cholera blood by wire partitions placed 3 feet apart, contracted the disease in from 17 to 23 days. Numerous attempts made to isolate *Bacillus suipestifer* from the feces of hogs affected with cholera and dysentery proved unsuccessful. Pigs that were fed cultures of *B. suipestifer* sickened and developed diarrhea, but in no case was *B. suipestifer* recovered from the feces, although an organism somewhat resembling it was constantly isolated. The administration of thymol-chenopodium in capsules failed to prove of value in removal of intestinal worms.

In an outbreak of a disease in horses that resembled forage poisoning, in which 16 of 32 horses on a farm died between February 15 and March 2, an organism morphologically similar to *B. botulinus* was obtained from the cecum of one horse, but it did not produce toxin. Botulinus antitoxin of the B type

was administered subcutaneously in doses of 40 to 80 cc., repeated in two days, but did not seem to prevent the disease or retard its progress.

The preparation of chicken-pox vaccine was begun early in the year, 1,286 birds in six flocks being tested with satisfactory results. A summary is given of the laboratory diagnoses made during the year, and reference is made to the production of antihog-cholera serum and serum tests and to agglutination and bacterin tests.

ON THE VALUE OF NON-SPECIFIC IMMUNIZATION IN THE ERADICATION OF VIRULENT FOOT-AND-MOUTH DISEASE. E. F. Muller, Schweiz. Archiv. fur Tierheil., vol. 63 (1921), p. 326.

The great epizootic in 1920 brought out the fact that the treatment with serum from recently recovered animals confers no greater immunity than normal serum injection. Favorable results were obtained in thousands of cases treated with intramuscular injection of 100 cc. of "Aolan," a non-specific remedy, causing neither febrile nor anaphylactic reactions. Symptomatic treatment must not be omitted. The enormous loss of water, which unfavorably influences the heart and intestinal tract, must be replenished and general care taken along with the non-specific treatment.

(Aolan is a sterile solution of milk albumin advocated by E. F. Muller for treatment of sykosis parasitaria, furunculosis and other staphylococcus skin infections.) W. N. BERG.

A CASE OF CANCER OF THE STOMACH IN THE HORSE. D. Kramell, Berl. Tier. Woch., 1919, p. 259.

A 14-year-old gelding gradually became emaciated, extending through a period of 10 months. The animal showed symptoms of chronic gastric catarrh. On post-mortem examination a cleft, semi-spherical tumor of about 35 cm. in length, 22 cm. in width and 15 cm. in thickness, was found in the esophageal portion of the stomach. Microscopical examination revealed the tumor to be a flat-celled epithelial cancer, with the formation of cancer pearls. J. P. O'LEARY.

THE DIAGNOSIS OF ANTHRAX THROUGH THE EXAMINATION OF THE BONE-MARROW. W. Pfeiler. Deut. Tier. Woch., 1919, p. 110.

The cultural examination of the bone-marrow recommended by Wulff in the year 1912 had proved reliable, when the testing of other organs failed, owing to putrefaction. On the other hand, the microscopical tests of the bone-marrow and the animal tests were not always a diagnostic certainty, particularly so in the case of the microscopic examinations. The bacteriological examinations are rendered more reliable by means of the plate procedure. At the same time, according to Pfeiler, the precipitation method should be used in all cases as a supplemental aid in diagnosis. J. P. O'LEARY.

CHAULMOOGRA OIL IN THE TREATMENT OF TUBERCULOSIS. W. S. Culpepper and M. Ableson. Jour. Lab. and Clin. Med., Vol. VI (1921), p. 415. Abs. in Amer. Rev. of Tuberc., Vol. V. (1921), p. 124.

The similarity in morphology and staining characteristics of leprosy bacilli and tubercle bacilli, and the specific action of chaulmoogra and its related oils on the acid-fast group of bacteria, furnish a scientific basis for using them in the treatment of tuberculosis. The acid fractions of chaulmoogra oil, obtained by the method of Hollmann and Dean and modified by Aldrich, were used in the following experiments: Forty-eight guinea pigs were divided into 5 groups: (1) 12 pigs were inoculated with human type tubercle bacilli and left without further treatment as tuberculosis controls; (2) 12 pigs were similarly inoculated and divided into groups of 3 each, which were given intraperitoneal doses of the acid sodium salts of the four fractions, A, B, C and D, of acids of chaulmoogra oil; (3) 8 pigs were left as entirely untreated controls; (4) 12 non-tuberculous pigs received the same treatment as the tuberculous pigs of group two; (5) 4 pigs received increasing amounts of the A, B, C, and D fractions in a toxicity test. This report is described as preliminary; but the following findings are given: One per cent solutions of the acid sodium salts of the four fractions are least irritating and are readily absorbed from the peritoneum. No pathological findings could be attributed to the drug. On the other hand, it seemed to cause an increase in weight. A bac-

tericidal action on tubercle bacilli in 1:10,000 dilution was found. Of the 12 pigs inoculated with tuberculosis and not treated all died except one. Of the 12 treated tuberculous pigs only one died of the disease. The others were killed for comparison, one whenever a tuberculous nontreated pig died. A marked difference in pathological findings was observed, the advantage being in favor of the treated pigs. Treated pigs showed an average gain of weight of 49 gms. over the ones not treated.

CHAULMOOGRA OIL IN LEPROSY AND TUBERCULOSIS. L. Rogers. Lancet, June 4, 1921, p. 1178. Abs. in Amer. Rev. of Tubere., vol. 5 (1921), p 168.

A recent experimental investigation has been made with derivatives of chaulmoogra oil, especially sodium morrhuate, sodium gynocardate and hydnocarpic acid, which had proved effective in the treatment of leprosy, in animals infected with tuberculosis. In the acute general tuberculosis produced in very susceptible animals, the results were entirely negative, except for an early febrile reaction followed by a fall of temperature, in 2 goats which eventually succumbed to the infection at about the same time as a control animal. It is pointed out that these animal infections are equivalent to acute general tuberculosis in man, so that the failure in such cases does not prove the drugs to be useless in the more chronic forms of tuberculosis, which form the great majority of human cases. Rogers concludes that these drugs are worthy of further trial in the more chronic forms of the disease, and especially in lupus and surgical tuberculosis, where any changes will be visible and easily observed.

We have just received a copy of an able address on the subject of tuberculosis, delivered recently by Dr. W. H. Dalymple before the East Baton Rouge Parish Anti-Tuberculosis League, of which he is an active member. In his address Dr. Dalrymple gives a brief résumé of the accomplishments of research workers and what is being done to suppress and eradicate this dreaded scourge of both animals and human beings. The address was devoted largely to human phases of the subject and has been published in pamphlet form.

REVIEWS

ANATOMIE REGIONALE DES ANIMAUX DOMESTIQUES TOME III. PORC. (Regional Anatomy of the Domestic Animals. Vol. III. The Pig.) By E. Bourdelle. Librairie J. B. Bailliere et Fils, Paris. 1920.

This is the third book of the series on the Regional Anatomy of the Domestic Animals by Montane and Bourdelle, professors of anatomy in the Veterinary Schools of Toulouse and Alfort, respectively. The first, that on the horse, appeared in 1913, and is a most impressive book of 1069 pages and 564 figures. In the preface to that volume the authors refer to the excellent treatise (Anatomie comparée des animaux domestiques) conceived and published by Chauveau, the great French master of anatomy, and continued and amplified by worthy successors, Arloing and Lesbre, as constituting the fundamental source of veterinary anatomical knowledge. The authors then raise the question whether the method of presentation employed in this classical text and adapted to the traditional method of instruction is capable of certain modifications which would adapt it better to practical requirements. In answering this question the attempt is made to substitute the "practical idea of relations" for the "functional idea of the organ." This might fairly be paraphrased as a substitution of the topographic method for the systematic. If the reviewer may be permitted to express an opinion on this point it seems to him rather futile to indulge in a polemic on the relative values of these methods. Both methods have essential values which should be realized as far as is possible within the limitations imposed by the capacity of the anatomical worker and the time available in a well-balanced curriculum. A great amount of our anatomical knowledge is useful mainly as physiological material, and, so far as the veterinarian is concerned, much of it is valuable solely on this ground. On the other hand the field of veterinary surgery is circumscribed by limitations which do not exist in human practice and which, so far as we can see at present, are not likely to be removed. It would seem that the authors of the work under consideration have taken these facts into account, since a large amount of their treatment of the subject is distinctly systematic and not topographic; indeed one may justly say that the strictly topographic

matter constitutes a minor part of the contents. This is not intended as an unfavorable criticism, except in the sense of a suggestion that the title does not appear to designate quite accurately the character of the work. The question is perhaps an open one as to the wisdom of incorporating in a text book of regional anatomy of the horse, for example, 319 pages dealing with general consideration of the various systems and anatomical methods, together with a great deal of space devoted to systematic descriptions of bones, joints, muscles, etc. The necessary result is a book of very great bulk (1069 pages) in proportion to its content of actually topographic description. The reviewer does not feel that these systematic descriptions include any important additions to our knowledge, although the numerous figures, most of which are excellent, are very welcome.

The volume on the pig is a handsome book of 386 pages, and, on account of the death of Professor Montane several years ago, is exclusively the work of Professor Bourdelle. It contains 167 figures, which are, with very few exceptions, original and of high quality. It is generally recognized that good illustrations are a *sine qua non* in anatomical publications, and in this respect M. Bourdelle is to be warmly congratulated. When it is noted that a great many of the illustrations—including most of the more difficult ones—are the work of the author, one realizes that M. Bourdelle combines the painstaking skill of the trained anatomist with artistic ability of a high order. Only those who have done work of this kind can realize the difficulties involved and can appreciate fully the value of this contribution to veterinary anatomical literature.

The first 68 pages are devoted to general consideration of the zoological position, morphology, and the various organ-systems. The second part contains the regional anatomy. A good deal of space, however, is given to systematic description of the bones, joints, muscles, etc., so that the strictly topographic matter is not quite so full nor so accurate in certain directions as one might wish. In this respect the account of the thoracic and abdominal viscera is a little disappointing. The technique of in situ hardening and frozen sections and combination of these methods seem still to be little used by European veterinary anatomists and this defect in procedure is incomprehensible to American workers. One is almost shocked to learn that in Europe the surfaces of the pig's liver are both moderately convex.

Fortunately Professor Bourdelle gives two excellent full-page, colored figures illustrating lateral views of the viscera in situ. The topography of the head, neck and limbs is well depicted by a sufficient number of colored figures of generous size. For the large number of veterinarians who do not read French these excellent illustrations constitute the chief value of the book, and one may be permitted to express the hope either that translations may be available or that the revised Latin names might be given in future editions. In this way these masterpieces of Bourdelle and the lamented Montane might receive the international recognition which they so well deserve. S. S.

A COMPLIMENT TO PROFESSOR WILLIAMS

In the August, 1921, number of THE JOURNAL, the attention of the members of the veterinary profession was called to a book recently published by Dr. W. L. Williams on "The Diseases of the Genital Organs of Domestic Animals." A review of this book by Dr. J. Whitridge Williams appears in the September, 1921, number of the *Bulletin of The Johns Hopkins Hospital*, in which the author states, in referring to Dr. W. L. Williams' book:

"This large volume by the professor of obstetrics and of research in the diseases of breeding cattle in the Veterinary College of Cornell University is highly creditable to its author and represents a valuable contribution to American medical literature. I earnestly recommend it to scientifically minded obstetricians and gynecologists, as I feel sure that when they have read it they must agree with me that they have learned much, have had their imagination stimulated, and have to confess, so far at least as certain problems are concerned, that human gynecologists may learn something from their veterinary colleagues."

The review, as a whole, speaks very highly of the recent publication on "The Diseases of the Genital Organs of Domestic Animals," and as it is written by one of the foremost authorities on obstetrics and gynecology in the medical profession, it is regarded as an unusual compliment to the veterinary profession, as well as to Professor Williams.

ARMY VETERINARY SERVICE

A LETTER FROM GENERAL IRELAND

The Officers' Reserve authorized by law since 1920 and now in a position, under the new regulations, to complete its organization, is bound to become a tremendous asset to the country in future emergency. It provides a reservoir of civilians from which will be drawn officers of reasonable training and experience, commissioned in appropriate grades and assigned beforehand to specific duties for which they are fitted. All branches of the service are represented by sections in the Reserve. One who recalls the almost insurmountable difficulties associated with the mobilization of the veterinary profession in 1917, will appreciate the importance of our having for the future a large, representative, and well organized Veterinary Reserve Section. If, to the enthusiastic support which the civilian profession gave the veterinary service during the World War, there could have been added such qualifications as military training and instruction, predetermined rank and position in the military forces, and active, intelligent interest in Army veterinary matters, the problem of organizing the veterinary service would have been relatively simple. A large membership in the Reserve is absolutely necessary for the best results in the future.

The veterinary section of the Reserve now has some 400 officers and is slowly growing. Membership therein is evidence of a patriotic desire on the part of the individual to fit himself to render the best possible service to his country when it needs him. I like also to feel that such membership is a manifestation of interest and support for the Veterinary Corps, which represents the veterinary profession in the Regular Army. I can assure you that a Reserve composed of representative civilian veterinarians will prove a valuable asset to the Veterinary Corps in its development and progress. Thus far, the Reserve does not seem to have attracted the veterinarians of the country as a body, particularly the older men, many of whom have been in the Army. This is an unfortunate situation which it will give me profound satisfaction to see corrected.

I trust you may be able to give these matters proper pub-

licity to aid in arousing a healthy interest in the Veterinary Officers' Reserve amongst the members of the veterinary profession.

M. W. IRELAND,
Surgeon General, U. S. Army.

NEW REGULATIONS FOR OFFICERS' RESERVE CORPS

The new regulations for the organization and administration of the Officers' Reserve Corps have been completed and the issues are now being made by the Adjutant General of the Army. The distribution contemplates the issue of one to each Reserve Officer.

These regulations were drawn up by a committee composed of an equal number of Regular Army officers and officers of the Reserve Corps and National Guard and have been issued by the Secretary of War as Special Regulations 43.

The purpose of the Officers' Reserve Corps is to provide a reserve of officers available for military service when needed and is intended to furnish the necessary officers for assignment to all components of the Army of the United States.

STATUS OF THE OLD VETERINARY RESERVE CORPS

A large number of veterinary officers were commissioned during the World War in the Veterinary Reserve Corps. By the Presidential Proclamation of August, 1918, these officers, while on active duty, lost their identity as Reserve Officers and became Veterinary Officers of the Army of the United States which absorbed all existing units whether of the Regular Army, National Army or National Guard. The only distinction existing between officers therefore was the term of commission, some being permanent and others temporary.

The discharge of these officers after the war effected a complete separation from the military establishment, that is to say, temporary officers did not revert to their former status as Reserve Officers. Unless such former officers have been offered and have formally accepted commissions they are not now officers of the Reserve Corps. Members of the old Veterinary Reserve Corps who were not called to active duty during the war were automatically transferred to the new Reserve Corps.

Former officers should know, therefore, that they are not members of the Reserve Corps unless they have accepted a com-

mission formally tendered by the Adjutant General since their discharge from the Army. Their desire to become members of the Reserve Corps, signified at the time of their discharge (Form 105), does not itself commission them as Reserve Corps officers.

THE NEW OFFICERS' RESERVE CORPS

Composition.—A Reserve Section has been created corresponding to each branch of the Regular Army. The President, furthermore, is empowered by the Act of June 4, 1920, to create such additional sections as may be required. Accordingly the Medical Department Reserve comprises Medical, Dental, Veterinary, Medical Administrative and Sanitary Sections. The Medical, Dental and Veterinary sections are composed of graduates of reputable medical, dental and veterinary schools, the Medical Administrative Section of persons having practical experience in administrative duties pertaining to the medical department, the Sanitary Section of persons of broad experience and ability who have had practical experience in professions and occupations allied to special duties of the Medical Department exclusive of administrative duties. This latter comprises psychologists, sanitary engineers, food and nutrition experts, chemists, hospital architects, laboratory and X-ray technicians, statisticians and technical men engaged in the production of supplies and appliances used by the Medical Department. Many of these were commissioned during the war in the Sanitary Corps which ceased to exist on December 31, 1920.

APPOINTMENT

Eligibility.—In time of peace citizens of the United States and the Philippine Islands between 21 and 60 years of age.

Officers of the Army of the United States between April 6, 1917, and June 30, 1919, National Guard Officers holding federally recognized commissions as such on June 4, 1920, and persons who served in the Army between these dates and were recommended for commission, may be appointed upon examination of military records supplemented by personal examination if necessary.

Civilians—that is, those without previous military service—are eligible for appointment in the Reserve Corps upon examination, to any grade for which found qualified.

After November 11, 1923, no appointment will be made

solely upon the examination of records and former officers will be examined and appointed under the provisions applying to civilians without such service which regulations provide for an examination under the direction of Corps Area Commanders with final action by the War Department. (Further provisions are made in the regulations for appointment of graduates of Reserve Officers' Training Corps, Flying Cadets, Warrant Officers, enlisted men, etc.)

Applications for appointment should be addressed to the Commanding General of the Corps Area in which the applicant lives. These Corps Areas are as follows:

First Corps Area. Headquarters, Army Base, South Boston, Massachusetts. Comprises the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

Second Corps Area. Headquarters, Governors Island, New York. Comprises the States of New York, New Jersey and Delaware.

Third Corps Area. Headquarters, Fort Howard, Maryland. Comprises the States of Pennsylvania, Maryland, Virginia and the District of Columbia.

Fourth Corps Area. Headquarters, Fort McPherson, Georgia. Comprises the States of North and South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi and Louisiana.

Fifth Corps Area. Headquarters, Fort Benjamin Harrison, Indiana. Comprises the States of Ohio, West Virginia, Indiana and Kentucky.

Sixth Corps Area. Headquarters, 1819 West Pershing Road, Chicago, Illinois. Comprises the States of Illinois, Michigan and Wisconsin.

Seventh Corps Area. Headquarters, Fort Crook, Nebraska. Comprises the States of Missouri, Kansas, Iowa, Nebraska, North and South Dakota, Minnesota and Arkansas.

Eighth Corps Area. Headquarters, Fort Sam Houston, Texas. Comprises the States of Texas, Oklahoma, Colorado, New Mexico and Arizona.

Ninth Corps Area. Headquarters, Presidio of San Francisco, California. Comprises the States of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada and California.

Grades. Appointments of officers of the World War will not

be made in a grade higher than that previously held in the Army.

Period of appointment. Five years. A reappointment will generally be tendered without examination.

Acceptance of appointment. There must be a formal acceptance or declination. If not accepted or declined within 60 days the appointment will be cancelled.

Dual commission in the Reserve Corps and National Guard. A Reserve Corps Officer may hold a commission in the National Guard and vice versa.

ASSIGNMENT

Every Reserve Officer is to be assigned to a unit or specific duty. The term "assignment" refers to a designation or selection for a class of duty or specific duty for which it is contemplated to use the officer in time of emergency and for which it is contemplated he be trained in time of peace. The fact o assignment does not imply active duty. In time of peace the duties in connection with Reserve Units of a permanent or continuing nature will be performed by Regular Officers detailed for the purpose. (See active duty.) Officers are generally assigned to units in proximity to their homes.

Classification. As a basis for assignment the officers of the Medical Department Reserve Sections are classified by the Surgeon General according to their special qualifications as determined by a review of their entire military record and of the "Personal Report and Statement of Preferences for Reserve Officers" which is rendered by each officer. Groups are accordingly made up representing every specialty of medical practice to the end that intelligent and appropriate assignments can be made. The two main groups are then separated —the Territorial Assignment Group and the Branch Assignment Group. The former, TAG, comprises those officers especially suited to fill the positions in the Medical Department of the military units to be organized by the Corps Area Commanders. These comprise the divisions, of which three are to be organized in each corps area, together with certain attached and auxiliary troops.

The Branch Assignment Group, BAG, comprises those held for assignment by the Surgeon General to special duties and activities not included in those organized by the Corps Area Commander. These will include the hospitals functioning be-

hind the division, such as the surgical, evacuation, convalescent and general hospitals and other medical department units of the communication zone and zone of the interior, as well as special units concerned with the mobilization and administration of the medical department service.

All Reserve Officers, however, residing in a Corps Area are under the administrative control of the Corps Area Commanders.

ACTIVE DUTY

According to law no Reserve Officer shall be employed on active duty for more than 15 days in any calendar year without his own consent, except in time of a national emergency expressly declared by Congress. So far as practicable the personal desires of officers to be called to active duty will be considered when funds for training for only a portion of the Reserve Force in any year are available. The funds appropriated by Congress are at the present time insufficient to train any considerable number of Reserve Officers, even volunteers. Only volunteers will be detailed to active duty, funds permitting, for instruction at Service Schools or with the Regular Army for a period of more than 15 days.

Exemption from active duty. A Reserve Officer called to active duty for training purposes during any calendar year and upon whom such duty, for business or other good reasons, would work a hardship, will, upon request, be exempt from such tour of duty.

PAY AND ALLOWANCES (ON ACTIVE DUTY)

Same as for officers of the Regular Army in the same grade and with the same length of service, and mileage from his home to his first station and from his last station to his home. Reserve Officers are not entitled to retirement or retired pay.

TRAINING

The training program will be announced annually when appropriations have been made by Congress. It is the aim of the War Department to establish training facilities for 15 days every calendar year for Reserve Officers who can, without hardship, devote this time to training. Additional training, consisting of long periods of instruction at Service Schools and duty with the Regular Army and participation in Regu-

lar Army activities, may be added to this program from time to time.

PROMOTION

A uniform system of promotion alike for all branches of the Reserve has been established. For all sections of the Officers' Reserve Corps promotions may be made under the following conditions:

(*a*) An officer must signify his willingness and must be recommended to be examined for promotion.

(*b*) An officer must have served the prescribed minimum time in the grade from which promotion is contemplated.

(*c*) An officer must have satisfactorily passed the promotion examination.

Minimum time to be served in each grade. To be eligible for promotion to any grade an officer must be credited with three years' service in the next lower grade, *one year of which must in every case have been in the Officers' Reserve Corps since November 11, 1918.* In computing the required three years' service in any grade, there will be credited service in that grade in the Officers' Reserve Corps since November 11, 1918, and active service in the same or higher grade in any component of the United States Army between April 6, 1917, and December 31, 1920, *double time* being given for such of the *above active service* as was rendered during the period of hostilities; *i. e.*, between April 6, 1917, and November 11, 1918. Except for the one year which must have been in the Officers' Reserve Corps, there will also be credited service as a federally recognized officer of the National Guard since November 11, 1918. No service of any kind prior to April 6, 1917, is to be credited, nor is any but active service between April 6, 1917, and November 11, 1918, to be credited.

Examination. Conducted by Corps Area Commanders by board of three officers not lower in grade than that of the applicant.

Scope of the examination. (*a*) Physical fitness; (*b*) moral character; (*c*) general fitness; (*d*) professional fitness.

The professional examination consists in:

1. Basic military subjects, essential to all branches of the service for all officers of the Medical Department:

Subject	*Scope*
Administration.	General knowledge of regulations and care and use of Government property as applicable to the officer as an individual; channels of correspondence.
Customs of the service, courtesy and military discipline.	The essential customs of the service and the courtesy expected of all officers; the purpose of discipline and the best means by which maintained.
Military hygiene.	Personal hygiene in the field and the conservation of health.
Practical efficiency.	Ability to put to practical use, in the capacity for which being examined for promotion, the knowledge possessed.

2. Special subjects essential to grade and office to which promotion is contemplated. For veterinary officers this will consist in:

Recent progress in veterinary medicine, surgery and hygiene—animal and meat and dairy.

SUMMARY

The Veterinary Reserve Corps is thus to be organized and administered in the interests of veterinary military preparedness and by regulations drawn up by a committee prescribed by law upon which the Reserve Corps was well represented. Being a national asset to be used in an emergency which in modern times seems to call for the mobilization of practically every activity in the country, it should have the support of the entire veterinary profession. *If the veterinary profession can not support it as thus organized, it should demand that it be so organized as to warrant its support.*

In compliance with law the Secretary of War has provided

1. For the organization of units of the organized reserve of a strength considered sufficient for first-line defense.

2. For the enrollment of Reserve Officers.

3. For the classification of officers with appropriate assignments according to special qualifications.

4. For a uniform system of promotion.

5. For a training program, largely voluntary, which will so far as Congressional appropriations permit, and at the same time safeguard the civilian practitioner of veterinary medicine from compulsory active service in time of peace when such service would work a hardship.

The variety of veterinary units to be organized would seem to offer an opportunity to every veterinarian to list his services in the general scheme of veterinary preparedness.

Brigadier-General Frey, formerly Director General of the French Army Veterinary Corps, who was recently placed on the retired list by the Minister of War, will make his future home in Paris.

The graduating classes of 1921 at the three French national veterinary schools numbered 136, of whom 63 were at Alfort, 37 at Lyons, and 36 at Toulouse. The total number of students at Alfort at the close of the last school year was 235, and at Toulouse 151. Thirty-seven at Alfort and 13 at Toulouse were from other countries. We have seen no statement of the attendance at Lyons.

A large number of French veterinarians have recently received honors from the French Government in recognition of meritorious service of various kinds—educational, research and military. Prof. Dechambre of Alfort, and Prof. Girard of Toulouse, have been awarded the cross of the Legion of Honor, and the educational distinction of "Palmes Académiques" has been conferred on Prof. Arloing of Lyons, and Prof. Panisset of Alfort.

JUST FOR FUN

A schoolboy wrote an essay on cats. The chapter on different breeds supplies the following information:

"Cats that's made for little boys and girls to maul and tease is called Maltese cats. Some cats is known by their queer purrs —these are called Pursian cats. Cats with bad tempers is called Angorrie cats. Cats with deep feelin's is called Feline cats."
—*Selected.*

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-Eighth Annual Meeting, Denver, Colo., September 5 to 9, 1921

(*Continued from the November* JOURNAL)

TUESDAY AFTERNOON, SEPTEMBER 6, 1921

GENERAL SESSION

The meeting convened at 1:30 p. m., President White presiding.

PRESIDENT WHITE: The first item of business for the afternoon is an additional report of the Executive Board, which will be presented by Secretary Mayo.

REPORT OF EXECUTIVE BOARD

SECRETARY MAYO: The following applications have been received since the previous meeting of the board. They have been acted upon by the board and are favorably recommended:

Dr. A. E. Anderson, Grand Island, Nebr.
Dr. Hudson Chadwick, Jackson, Miss.
Dr. T. B. Carter, Portland, Oreg.
Dr. B. C. Taylor, Hillsboro, N. Dak.
Dr. D. L. Zee, Minotte, N. Dak.
Dr. A. J. Matelle, Crystal, N. Dak.
Dr. W. H. Hilts, Elko, Nev.
Dr. F. M. Coombs, Hamiota, Manitoba.
Dr. W. R. Winner, Alma Center, Wis.
Dr. Kenneth J. Moye, Hayes, Kans.
Dr. LaFayette J. Read, Indianapolis, Ind.
Dr. J. G. Townsend, Racine, Wis.
Dr. J. A. Sluss, Rhodell, W. Va.
Dr. George W. Neff, Charleston, W. Va.
Dr. S. C. Ross, Plainville, Tex.
Dr. W. E. Norden, Avoka, Iowa.
Dr. John D. Thrower, Denver, Colo.
Dr. W. A. Stephenson, Salt Lake City, Utah.
Dr. E. J. McBride, St. Paul, Minn.
Dr. George J. Cline, Omaha, Nebr.
Dr. W. L. West, Belfast, Me.
Dr. J. B. Taylor, Brookings, S. Dak.
Dr. H. H. Brown, St. Louis, Mo.
Dr. G. A. Bostrum, Wahoo, Nebr.
Dr. I. B. Boughton, Urbana, Ill.
Dr. V. V. Shattuck, Omaha, Nebr.
Dr. L. C. Cummings, Omaha, Nebr.
Dr. C. C. Officer, Grapeland, Tex.
Dr. J. Pugh, Plainville, Kans.
Dr. Floyd Cross, Fort Collins, Colo.
Dr. W. H. Johnson, Denver, Colo.
Dr. F. A. Laird, Springfield, Ill.
Dr. William Harvard, St. Augustine, Fla.

DR. HOSKINS: I move that the recommendation of the Executive Board be favorably acted upon, and the men whose names have been read be admitted to membership under suspension of the rules, the Secretary to cast the ballot.

(The motion was seconded by Dr. Glover and carried, the ballot was cast, and the applicants were declared elected to membership.)

SECRETARY MAYO: There is the resignation of Dr. R. M. Bell of Buffalo, N. Y. The Executive Board recommends that it be accepted.

(It was voted, on motion of Dr. Glover, seconded by Dr. Adams, that the report of the Executive Board be accepted.)

ELECTION OF OFFICERS

PRESIDENT WHITE: The next item of business is the election of officers. The Chair is ready to receive nominations for the following officers: President, five vice-presidents and a treasurer. Nominations will be made from the floor. Nominations for president are now in order.

DR. BELL: I nominate Dr. Ferguson of Wisconsin.

DR. JENSEN: In rising to second the motion of Dr. Bell, I desire to call the attention of this Association to the urgency of at this time electing a practitioner to this office. This office has been filled by men outside of the rank and file of practitioners. It is not my purpose at all to give you to understand that we don't allow the State school men and men engaged in other lines of endeavor, but in order to support and increase this institution and increase its membership I believe at this time a practitioner should be elected. There has been during the last year, I understand, a decline in the membership, a dropping out of over 300. We have a total membership of something like 3,900 where we should have 7,000. The only way I know of to stimulate interest and increase membership is by electing a practitioner. Therefore, I again take pleasure in seconding the nomination of Dr. Ferguson.

DR. GLOVER: I wish to nominate Dr. A. T. Kinsley. In a small western town there was a merchant who ordered a bill of goods from a wholesale firm in a distant city. The goods were received, but were not satisfactory. They were returned. The first of the month a bill came. It was returned with the merchant's reason. The wholesale firm then sent the bill to the city attorney. Then they sent a sight draft on the bank. Finally the wholesale firm received a letter to this effect: "I am the merchant that got your bill of goods that were not satisfactory. I am also the city attorney in this town. I am also the banker in this town, and if it weren't for the fact that I am also the preacher in this town, I would tell you to go to hell." (Laughter.)

Dr. Kinsley represents every side of the veterinary profession. As an educator he helped to build up the largest and one of the best veterinary colleges in the world. As an author, his texts are used in the veterinary colleges, and his books of reference are found in the library of almost every veterinary surgeon in this country; as a manufacturer of biologics, he has taken a prominent place. As a counsellor in veterinary lines, he is called to every part of the United States. He represents the profession in a large way. We all know Dr. Kinsley. The only objection I have heard anywhere to Dr. Kinsley is the fact that he is interested in commercial enterprises. Can you think of any reason on earth why that should be an objection to a man for the presidency of this Association? Dr. Kinsley has stood four-square before the world, honorable, straightforward, a leader in our profession. We are proud of him, and I want you to understand, as far as I know, in this district we are for Dr. Kinsley for the next President of the Association.

(The nomination was seconded.)

DR. ELIASON: In seconding the nomination of Dr. Ferguson, and speaking from the standpoint of a man from his home State, I wish to announce that Dr. Ferguson didn't cause himself to receive this nomination, but has received several letters urging him to run for this position. After getting several such communications, we came here with a view of finding out the sentiment. Dr. Ferguson is an out-and-out practitioner. He has been successful. He has done much to elevate the profession in his own State, and we believe him fully capable for the office for which he is nominated. It is not our purpose to come here to be an obstacle to anyone else, or deprecate the honors which may be given someone else. The good of the Association is the thing that we should have at heart.

(It was voted, on motion of Dr. Stange, duly seconded, that the nominations for president be closed.)

PRESIDENT WHITE: I will appoint the following members to act as tellers: Dr. S. E. Bennett, Dr. C. P. Fitch, Dr. R. D. Marsteller. These gentlemen will kindly distribute the ballots upon which you will write your preference.

SECRETARY MAYO: I have received the following message from Dr. Tom Smith of Jersey City: "Regret that my health will not permit attendance at the convention. The convention should not adjourn without paying some tribute to Dr. W. Horace Hoskins."

PRESIDENT WHITE: Gentlemen, so that you will not be kept waiting so long, and to facilitate matters, I will appoint another set of tellers to distribute ballots for the five Vice-Presidents. Unless you have some objection to this suggestion, I will ask Dr. C. H. Stange, Dr. H. P. Hoskins, and Dr. C. H. Hayes to distribute ballots and act as tellers.

SECRETARY MAYO: I want to call your attention to one section of the Constitution and By-Laws that says that no person shall be eligible to the offices of President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for five years preceding the election.

(The ballot for President was taken and the tellers retired to make the count.)

PRESIDENT WHITE: Nominations for Vice-Presidents are in order.

DR. EICHHORN: Mr. President, I would like to place in nomination the name of a man who has worked the Pacific Coast constantly and strenuously for the veterinary profession, Dr. McKenna of Sacramento, California. (Seconded.)

DR. NEWSOM: Since we started in in the far West, the next in order will be a man from Colorado. I would like to nominate Charles G. Lamb, who has been the leading spirit in the preparations for the convention that is now assembled. He is State Veterinarian of Colorado. (Seconded.)

DR. CARY: I nominate Dr. Hamlet Moore of New Orleans. (Seconded.)

DR. HILTON: I beg to nominate W. A. Hilliard of Winnipeg. (Seconded.)

DR. COTTON: I notice that the extreme East is not represented. I therefore place in nomination Dr. Robinson, Portland, Maine. (Seconded.)

DR. GOW: I notice you have candidates from various parts of the country. I would like to nominate Dr. John Eagle of Kansas City, Mo.

(It was voted, on motion, duly seconded, that the nominations be closed.)

SECRETARY MAYO: It has been customary for several years to make a motion that the one receiving the highest number of votes should be First Vice-President, the second highest, Second, and so on. There are five to be elected.

DR. BELL: I make a motion that that custom prevail.

(The motion was seconded and carried.)

PRESIDENT WHITE: It is customary to vote for five. In case there are more on the ballot, the lower ones will be dropped automatically.

(The ballot for Vice-Presidents was taken.)

PRESIDENT WHITE: The result of the ballot cast for President gives Dr. Ferguson 62 votes and Dr. Kinsley 100 votes. (Applause.) The Chair therefore declares Dr. Kinsley elected President for the ensuing year.

Will the same tellers kindly pass around ballots for the election of Treasurer and collect them? Nominations are now in order for the office of Treasurer.

DR. CARY: I place in nomination for Treasurer a man from

the South. I don't believe we could get a better man for the office, for they don't get them. Therefore, I nominate Dr. Jacob of Knoxville, Tennessee. (Seconded.)

DR. KOEN: I move that nominations be closed and that the Secretary be instructed to cast the ballot of the Association for Treasurer.

(The motion was seconded and unanimously carried, and the Secretary cast the ballot of the Association for Dr. Jacob.)

PRESIDENT WHITE: I declare Dr. Jacob elected Treasurer of this Association. (Applause.)

The result of the ballot cast for the five Vice-Presidents is as follows: Dr. C. G. Lamb, 157; Dr. McKenna, 135; Dr. Robinson, 133; Dr. Hilliard, 122; Dr. Moore, 111. I therefore declare Dr. Lamb First Vice-President, Dr. McKenna Second, Dr. Robinson Third, Dr. Hilliard Fourth, and Dr. Moore Fifth.

I have added to the Committee on Emblem the name of Dr. McKenna of California.

REPORT OF COMMITTEE ON LEGISLATION

PRESIDENT WHITE: We will have the report of the Legislation Committee.

(Secretary Mayo read the report of the Committee on Legislation, as follows:)

Your committee has kept in touch with any legislation which has had any bearing on the advancement of the profession.

The most important contemplated legislation has been that relative to the reclassification of the civil service of the United States. Bills have been inroduced in both Senate and House by different members of each body. These bills have been thoroughly gone over by the various committees, but to date no particular bill has been agreed upon. In one of these bills the veterinary profession was discriminated against, and only by the most active work of the profession, both in and out of the Federal service, was this discrimination removed and the profession classified similarly to the other learned professions. The Sterling Joint Committee of Congress on Civil Service Reclassification gave a hearing to Dr. John R. Mohler, Chief of the Bureau of Animal Industry, United States Department of Agriculture, who stated that the veterinarians in the civil service were entirely satisfied with the new classification now given them in the bills as recently amended by the committee.

Your committee has not been regularly called together to make any organized effort toward this reclassification legislation, as it considered it untimely to waste any activity or expend any funds for propaganda work until the Congressional committee had definitely decided upon the character of the bill it would report out of committee. It is believed that the veterinarians are well organized to make this effort when the proper time arrives.

When the call is made to the profession to back up this legislation, which affects thousands of our brethren in the various civil branches of the Federal service, it is hoped that every member will personally interest himself in this work and will so utilize his efforts that Senators and Representatives in Congress will give these illy-paid public servants an adequate, living salary and not keep them in suspense from year to year by merely allowing them the war-time "bonus," a

sort of act of charity by Congress. The efforts of the profession should be directed toward personal interviews with Senators and Representatives, inviting their attention to the very inadequate salaries now paid veterinarians in the civil service and the great loss sustained by the Government every year by the resignation of many highly trained veterinary specialists, owing to the low salaries paid them, and their replacement by untrained men who can not be of much value to the service for several years.

Much good can be directed toward these efforts by veterinarians seeking the aid of livestock associations, breeders' associations, women's clubs and various civic centers.

Your committee is thoroughly aware of the fact that without the aid of each veterinarian it can not be successful in its efforts. Personal activities of veterinarians in their home districts have far more effect on molding the opinions of Senators and Representatives than have high-priced committees convening in Washington. Every veterinarian has the acquaintance of several prominent men in their respective sections; it is truly wonderful the effect that interviews and letters from such citizens have on our national legislators. Short articles in the local press do very much good when properly forwarded to Washington.

The Legislative Committee is ready and anxious to further this legislation in all possible ways when the opportune moment arrives.

JOHN P. TURNER, *Chairman.*
S. J. WALKLEY.

PRESIDENT WHITE: You have heard the reading of this very excellent report. What is your pleasure in regard to it?

DR. KIERNAN: I move that it be adopted and that the committee be urged to keep in touch with the legislation now pending in Congress and serve the Association and profession whenever called upon to do so.

(The motion was seconded and carried.)

REPORT OF REPRESENTATIVE ON ADVISORY BOARD OF THE HORSE ASSOCIATION OF AMERICA

PRESIDENT WHITE: Are any other committees ready to report?

SECRETARY MAYO: I have a report from Dr. Dick, who is a member of this Association representing this Association in the work done by the Horse Association of America.

(Secretary Mayo read Dr. Dick's report, as follows:)

As representative of the American Veterinary Medical Association on the Advisory Board of the Horse Association of America, I want to present the following report of the work done by the Association during the past year.

The first piece of work was the gathering of proof of the superiority of horses and mules in various classes of work. This was the foundation. It was necessary to have proof that horses and mules were more efficient and economical than mechanical motive power or their whole campaign would be useless. Trained investigators were sent to New York, Philadelphia, Boston, Buffalo, Chicago, St. Louis and numerous other cities to collect data from business men, cartage and transfer men, ice companies, coal companies and all users of transportation. It was found that some men had sold their horses and purchased trucks, but after giving them a thorough trial had discarded

them and gone back to horses. The following is what A. Moll Company, wholesale and retail grocers, in St. Louis, had to say on that subject, which is just a sample of many such letters:

"We found after keeping accurate records that the cost of maintaining trucks was astonishing in comparison to horse-drawn equipment, and the service not so reliable. At present we are using 65 head of horses and mules, and I believe as soon as other concerns now using motor transportation figure their costs they will return to horses."

The Horse Association also found that the cost per day of operating a team truck with a pair of heavy draft horses that would pull five tons or more on city streets was from $4.06 as a minimum to $7.75 as a maximum, exclusive of driver. With the driver at $5.00 a day the total would be from $9.06 to $12.75 a day.

Against this it was found that it costs from $25 to $30 a day to operate a five-ton motor truck, or more than twice as much as a five-ton team truck that would haul the same load.

A company of Evanston, Ill., found that for the entire year of 1919 their cost of delivery with horse-drawn equipment was 6¼ cents and with motorized delivery 8 1-5 cents per package.

In the use of tractors on farms it was found that horse-drawn equipment was more efficient, reliable, economical and flexible than mechanical motive power. One of the most notable examples of this is the farm comprising 30,000 acres owned by the Noble Foundation Company, Ltd., of Alberta, Canada. On this farm it was found that for double disking and harrowing it cost 42 cents an acre with horse-drawn equipment, 60 cents an acre with steam tractors, and 70 cents an acre for gas tractors. This company hitches 12 horses to three grain drills and seeds on an average 75 acres per day per man. They are discarding their tractors and using horses exclusively.

One of the most important facts disclosed by the investigations made by the Horse Association of America is that fixed charges on trucks standing idle exceed the cost of feeding horses with equivalent working capacity. The motor salesman has usually made the claim that it cost comparatively little to keep a truck when it was idle. This should be a serious blow to motor interests.

The next step was to determine the users of horses and mules in non-agricultural work. A list comprising the names of 204,000 firms has been compiled, as follows:

Coal dealers with over $10,000 capitalization	8,746
Teaming and transfer companies	7,150
Retail grocers rated over $1,000	59,142
Wholesale grocers	3,827
Department stores	4,688
Packers	388
Ice dealers	6,011
Dray and express companies	11,140
Milk dealers	10,167
Grading contractors	762
Gravel and sand companies	1,350
Bakeries with over $1,000 capitalization	27,476
Heavy hardware (wholesale)	1,217
Lumber dealers	27,022
Lumber manufacturers (sawmills)	16,579
Mines of all kinds	18,400
Total	204,065

The first seven groups had been reached on December 1, 1920, with personal letters and circulars dealing with their particular problems.

A supplementary distribution of literature has been made as follows:

Saddlery firms and their salesmen.
Hay, grain and feed dealers.
Horseshoers.
Horse and mule dealers.
Wagon and buggy makers and dealers.
Veterinarians (list of 4,000).
Country bankers, 23,364.

Another important piece of work undertaken by the Horse Association of America is that of encouraging the production of horses. It has been found that there has been a tremendous decrease in the production of horses in the great horse-producing States. When we realize that the eastern and southern parts of the United States depend on this section for their horses we can appreciate the seriousness of the situation. These horse-producing States are not only falling down on the production of new horses, but those now found on a large percentage of the farms are four years old or over. This means that unless farmers begin to produce horses at once a serious shortage is bound to come suddenly and the prices will be exorbitantly high. This will be to the advantage of the motor interests.

The Horse Association is reaching the farmers by circularizing with letters and leaflets the leaders of farm sentiment. This list is as follows:

County agents and farm bureau officers.
Stallion and jack owners and leading horse breeders.
Bankers in all towns under 30,000.
Auctioneers and horse buyers.
Country harness dealers, horseshoers, wagon and carriage dealers.
Hay and grain dealers.
State fairs and State boards of agriculture.
State stallion enrollment boards.

In addition to this, contributions have been made to the agricultural press and to the weekly news service of 1,250 newspapers. This represented up to December 1, 1920, 9,490.5 linear inches reaching over 12,000,000 people.

Another line of work undertaken is the stimulation of the use of horses and ponies in the field of healthful recreation and sport. This included investigations of existing facilities for horseback riding in many of our cities and securing information from noted physicians on the influence of horseback riding on the maintenance of health and vitality in man. The co-operation of the American Remount Association, the Chicago Equestrian Association, the American Saddle Horse Breeders' Association and other saddle horse interests were secured in a nationwide campaign to provide more extensive facilities for horseback riding throughout the country. An effort is also being made to stimulate interest in driving horses for business and pleasure.

Another phase of the work done by the Horse Association of America is the stimulation of production of the right kind of horses. This is being done by literature prepared to show that profitable operation and marketability are dependent upon qualities of efficiency; by cash prizes offered at county fairs, the fairs duplicating the Association's money, and, finally, by direct work of field men who visit leading breeders and farmers, with whom they discuss this problem.

Up to December 1, 1920, a total of 1,100,000 pieces of literature containing the above-mentioned facts had been distributed to men who were interested in efficient, economical motive power units. These letters indicate to some extent the tremendous amount of work done by the Horse Association during the past year. Mr. Dinsmore, in a letter addressed to me on July 25, 1921, said: "Since the last annual meeting we have distributed a little more than one million and a half pieces of literature, and all of this material has gone straight to the men who are directly interested."

This work is apparently producing good results. It is reported from Boston that the sales of horses made by one man during the first four months of this year were over 5,000 head, as against approximately 4,000 head in 1920 for the same months, a gain of 25 per cent. A firm in New York City sold during the first five months of this year 14,239 horses as against 11,605 in the same period of last year. In Chicago the United States census, taken January 1, 1920, reported 30,388 horses. The licenses issued this year to June 1 show that there were approximately 33,660 horses in use in Chicago last spring, a gain of 3,000, or a little more than 10 per cent. Such excellent work should receive the hearty support of every veterinarian. In Pennsylvania the State Veterinary Medical Association and some of the veterinary clubs are actively supporting this Association. Every veterinarian should become an active member. To this end an active membership campaign was launched in Pennsylvania with gratifying results.

The good work of the Horse Association during the past year will no doubt be fully appreciated by the American Veterinary Medical Association, and it is hoped it will again actively lend its support to this work and appoint a member to represent it on the advisory board of that organization.

G. A. DICK.

PRESIDENT WHITE: What shall be done with this very excellent report?

(It was voted, on motion of Dr. Koen, duly seconded, that the report be accepted.)

REPORT OF COMMITTEE ON NECROLOGY

PRESIDENT WHITE: I will now call for the report of the Committee on Necrology, Dr. Connaway, chairman.

DR. CONNAWAY: I regret that we can not make a full report at this time. Some of the members of the committee to whom part of this work was assigned have not reported, but we will get the full report and file the data with the Secretary.

It seems to me appropriate at this time to have a little memorial service in honor of some of our distinguished members who have died during the past year, Dr. W. Horace Hoskins, Dr. James Law, Dr. E. A. A. Grange and Dr. F. S. Musselman. It has been suggested that Dr. Moore say a few words in regard to Dr. Law; that Dr. Adams speak concerning Dr. Hoskins; that Dr. Mayo and Dr. McGilvray say a few words in regard to Dr. Grange; and that Dr. Dimock respond for Dr. Musselman.

PRESIDENT WHITE: You have heard the suggestion of the Chairman of the Committee on Necrology. Is Dr. V. A. Moore here?

TRIBUTE TO DR. JAMES LAW

DR. V. A. MOORE: Those of us who have known Dr. Law, who have been his students and who have worked with him, have come to know the breadth of his knowledge, the interest he had in his profession and the sympathies he entertained for those who are striving to fit themselves for veterinary work.

Dr. Law was born in Edinburgh, Scotland, in 1838. He was graduated from the Veterinary College of Edinburgh. Following his graduation he studied human anatomy under William Turner and surgery under Joseph Lister, the father of antiseptic surgery. Later he studied at the great veterinary colleges of Lyons and Alfort. About 1860 he became professor of veterinary anatomy, physiology and materia medica in the New Veterinary College of Edinburgh and its continuation in London as the Albert Veterinary College. Besides his teaching, he practiced his profession in Scotland, in England, and for one year in Belfast, Ireland.

In 1868, at the solicitation of the Hon. Andrew D. White, he came to Cornell University to accept the position of professor of veterinary medicine and surgery. He was a member of the original faculty of the University and one of its most esteemed and influential men. He occupied the position as head of the department of veterinary science in the University until 1896, when he became director of the New York State Veterinary College established at the University, which position he held until 1908, when he retired at the age of seventy.

He was appealed to by both the State and Federal Governments in connection with the study and control of serious diseases of domesticated animals. He was a pioneer in America in putting veterinary medicine on a sound scientific basis. He gave valuable assistance to the Federal Government by his investigations in connection with hog cholera. Later he was sent by the United States Department of Agriculture as its representative to the International Veterinary Congress at Brussels, Belgium. He took an active part in the eradication of contagious pleuropneumonia from the United States.

Dr. Law was a thorough student. He was also an extensive writer on veterinary topics. For many years he was an authority in practically all branches of the science. He was skilled in diagnosis, a thorough anatomist and a successful surgeon. In addition to the valuable work he did as an investigator and practitioner, he was an inspiring teacher. There is a no more effective inspiration than that which has come from the work and life of Dr. Law, who, through his genius, his devotion to truth and his kindly acts, has demonstrated the power of man to succeed as a gentleman, a scholar and a leader. He exemplified the simplicity of success in righteous living and faithful, honest endeavor.

Dr. Law recognized that the animal husbandry of this country would soon require the services of a large number of scientifically trained veterinarians to combat the numerous destructive diseases of livestock that were beginning to gain a foothold here. He stood for higher veterinary education and adequate livestock sanitation. By his influence and personal efforts, the first State-supported veterinary college was established. Through his students of earlier years, over whom he had a profound influence, the Federal Bureau of Animal Industry was organized in 1884, and livestock sanitary boards were created.

Dr. Law was an idealist whose purpose and ambition in life has been the advancement of a cause rather than self. Like the great Pasteur, the work he was advancing stood between himself and the public. His pupils remember him as a master and also a man possessed of much human sympathy. With all his greatness he was a manly man with a sweetness of disposition rarely found among men. He will go down in history not only as a scholar, teacher and leader, but also as a man of kindness, courage and truth.

TRIBUTE TO DR. W. HORACE HOSKINS

PRESIDENT WHITE: Dr. Adams will speak in respect to the late W. Horace Hoskins.

DR. ADAMS: Last night, Dr. Connaway, Chairman of the Committee on Necrology, asked if I would say a few words in memory of Dr. Hoskins. I suggested that there were other men who had been more closely associated with him than I, and who possibly could more appropriately speak for him, but that weak argument was overruled, and I will not try to evade what I consider is a duty.

I am not familiar with all the salient facts in his professional life, but I knew the man as a man, and as such I would try to present him to you. He graduated from the American Veterinary School early in the eighties and pursued practice continuously in Philadelphia until some two years ago, when he accepted the presidency of the Veterinary College of the University of the City of New York.

His one passion in life, it seemed to me, was to organize the veterinary profession into working societies. He did not contribute anything notable in the way of veterinary discoveries. He was not an outstanding practitioner, but he was outstanding in exemplyfying the passion I have spoken of—the passion for getting old and young veterinarians together and getting them acquainted, organizing and inaugurating laws for better control of the profession and better relations between the profession and the public. That has been his life work. He has attended continuously, I believe, thirty-eight meetings of the A. V. M. A., has not missed one year in thirty-eight or possibly thirty-nine. He

has held nearly every position of honor in this Association. He was for many years Secretary of the A. V. M. A. He was always a prominent member upon its Legislative Committee. He gave of his time unstintedly, I believe, more than any man who has ever belonged to this American Veterinary Medical Association. Night and day, early and late, he had it in his mind. As I said before, it was a passion with him. Now that he is gone, I hope somebody will be raised up to carry on his work in the spirit in which he carried it on. He meant a great deal to this Association in its early days, and from now on we shall miss him. (Applause.)

TRIBUTE TO DR. E. A. A. GRANGE

PRESIDENT WHITE: Dr. Mayo will pay tribute to the late Dr. Grange of Toronto.

SECRETARY MAYO: When I became a student of Michigan Agricultural College in 1884, Dr. Grange was giving lectures on veterinary science in that school. I think he had recently come from Minnesota, where he had lectured for a time at the University of Minnesota. As a farm boy I was quite interested in horses, and Dr. Grange was a typical Englishman in his love for animals and particularly for horses. It was a mutual interest that brought us together in a way, and it was largely through his influence that I took up the study of veterinary medicine. I was under him a year as a student, and after I had completed my veterinary course I was appointed his assistant and was intimately associated with him for two years. He was a most delightful man to be associated with. I never had to ask him for anything; he always asked you if you wouldn't like so and so. He was a perfect gentleman, a pleasing lecturer, and I remember was several times voted by the students the most popular professor in college. He was instrumental in getting through the Legislature of the State of Michigan the law providing for a State Veterinarian, and he was the first man appointed to that position under the law, and held it, I believe, until he resigned in 1897 to go into other work.

I have always had the highest regard for Dr. Grange because of his sympathy and his perfect gentlemanliness. He was born in England, and came from a very fine family, but he was edulated largely in this country; was a graduate of Ontario. He was a very witty man, in a dry way, and those of you who had the opportunity of hearing him in California in 1910 extend an invitation to this Association to hold its next meeting in Toronto will recall the incident when he said he wasn't an orator, although he apparently attempted a little on this occasion. He said he wanted them to understand that Canada had mountains that reached to the skies, she had rivers hundreds of miles wide and millions of miles long, and, he said, "there is water in 'em." It wasn't so much what he said as the way he said it.

It was my privilege a few years ago to call on him at his home in Toronto. He was paralyzed, helpless, unable to speak; and yet the same merry twinkle was in his eye as always. (Applause.)

PRESIDENT WHITE: Dr. McGilvray of the Ontario Veterinary College will pay additional tribute to the memory of Dr. Grange.

DR. MCGILVRAY: Needless to state at this time, it was considerable feeling that prompted me to accede to Dr. Connaway's request that I should also bear testimony in regard to Dr. Grange. I fully appreciate the sentiments that have been expressed by Dr. Mayo here regarding the late Dr. Grange.

I was associated with Dr. Grange very closely since the year 1908, and during that time I learned to like him and to love him very much. The fact is that at the first glance one was apt to misjudge the late Dr. Grange. He probably hadn't acquired that gift which some have of immediately ingratiating himself into the presence of a stranger. He was somewhat reticent; the fact is, he was reticent to a degree; but as you became more closely acquainted with him you got to know him better and then found out that underneath the surface there was a great deal of warmth and humanness that, after all, meant a great deal.

In the later years of his life Dr. Grange did much for the veterinary profession and veterinary education as a whole. He undertook to take care of the Ontario Veterinary College at a time when it was being transferred from private ownership to state or government control. One can imagine the difficulties one would encounter under such circumstances. Previously this institution had been run privately, and the owner of the place, like the centurion of old, could say to his people, "Come," and they came, and "Go," and they went. Now, to be supervisor of an institution of that kind under government auspices you have to be guided by legislation. Dr. Grange succeeded in having proper legislation enacted governing the college, and through the work he did in that regard he has been able to show a clear vision for the future.

Dr. Grange was held in very high esteem by the student body. They got to know him and to like him, and I must say that in all those years I have never yet been able to find the student who could say otherwise than that Dr. Grange was a gentleman.

In the year 1918 he had reached the allotted span of sixty years of age, under which the Government requires all Governmen service to be terminated. Dr. Grange in that year was retired and superannuated. We still continued to have him, however, closely identified with the college. He felt so bound up in the work, even while he wasn't required to be at the college at all, that he came to that institution every morning at 9 o'clock sharp. I never knew Dr. Grange to be late; I never knew him to

fail to keep an appointment and be on time. It is well for us young chaps to keep in mind that punctuality is a great thing. Through the whole year he continued to take active interest and devote his entire time to the work of the college.

Unfortunately, he was attacked with what we ordinarily call a stroke. During the previous year he suffered from an injury he received through falling from a horse. When he became bedridden, I found him, as Dr. Mayo said, game to the core. I will say for Dr. Grange, if ever a man was game even in sickness, it was Dr. Grange. I saw him a few weeks before his death, and he was the same cheerful old fellow, always wanting to know if there was something he could do. He was a real gentleman and one of Nature's kind. (Applause.)

TRIBUTE TO DR. S. F. MUSSELMAN

PRESIDENT WHITE: Dr. Dimock of Kentucky will speak in memory of the late Dr. Musselman.

DR. DIMOCK: I know there are a number here who knew Dr. Musselman for a longer time than I did, and are therefore better prepared to speak on this occasion. Some of you will remember that there was a memorial of the late Dr. Musselman at the meeting of the United States Livestock Sanitary Association last December, and I would suggest that some of the things that were said at that time regarding his life work be used by the Committee on Necrology in its report to this Association. At this time I can only repeat a few of the points that were made then.

As you know, I have been in Kentucky only a little over two years, and while I had met Dr. Musselman at Association meetings, my acquaintance with him dates from July 1, 1919. Therefore what I say is from my own brief acquaintance with him and what I hear from those who knew him for a longer time. His work in the profession was that of a practitioner and State official. Of his activities in the profession we hear nothing but praise, and it seems that as time goes on, since his death, those who knew him best realize more and more the value of the man in his work. I am well acquainted and come in contact almost daily with some of the members of the Livestock Sanitary Board of Kentucky, and very frequently during the past few months, different ones have remarked to me how they miss him in the work. He was the leader of the Livestock Sanitary Board of Kentucky, and the members of that board had come to depend upon him as an adviser in directing them in their field of activity.

Dr. Musselman was an ideal man to work with and appreciated fully the value of cooperation. In our work at the university on animal diseases, friction with the State Department at Frankfort has been unknown; quite to the contrary, we could always depend upon Dr. Musselman for support. The men who were

under him as assistant State veterinarians looked upon him as a friend and adviser, much as young men look to their fathers for counsel.

The veterinary profession of the State of Kentucky felt that in Dr. Musselman they had a man whom all could accept as the type of professional representative of the best of our profession. He was the standard bearer of the profession in Kentucky. We miss him and honor his memory. (Applause.)

PRESIDENT WHITE: It would seem appropriate to close this little memorial service by having us stand as a body and in silence until you hear the fall of the gavel. These were eminent men, eminent fellow members who have passed from among us, who can never meet with us again, and on this earth at least whose faces we can never see again. I therefore ask you to stand in silence for a few moments.

(The audience arose and stood in silence for a few moments.)

GREETING TO DR. ARCHIBALD

DR. BENNETT: If it is in order at the present time, I would like to suggest that this Association now assembled in Denver send a telegram of greeting to Dr. Archibald, who has been unable to attend our meetings for the past two or three years on account of illness. He is a member of the Executive Board from the Fifth District. I think it would be well at this time to have the Secretary send a telegram of greeting to Dr. Archibald at his home.

(The motion was seconded by Dr. Kiernan and carried.)

REPORT OF THE COMMITTEE ON BOVINE TUBERCULOSIS

PRESIDENT WHITE: Is the Committee on Bovine Tuberculosis ready to report?

(Dr. Cotton read the report of the committee, as follows:)

Bovine tuberculosis, notwithstanding the long fight that has been directed against it, continues to hold its unenviable, high rank among the costly infectious diseases that plague our food-producing animals. But this should not discourage our efforts to combat it, as the dangers and losses for which it is directly and indirectly responsible have never before been better recognized by those who are interested, through either altruistic or selfish motives, in the conservation and perfection of the animal sources of our food supply, and the eradication activities of our Federal and State Governments have never been more active or promising. The outlook is so encouraging that we should unitedly try to dispel the gloom that too often clouds discussions on eradication, by cheerfully teaching that tuberculosis among animals can be wholly and permanently suppressed, and that we are moving toward its suppression as rapidly as the available men and means permit.

We should not assert or claim that the end can be reached in a year or two, because that would encourage false hopes and tend to discredit our judgment. The eradication of a disease which, in the United States alone, concerns more than 23 million dairy and nearly 43 million other cattle, requires time, and the relatively small number

of competent men who can be called on to test and examine this vast multitude of animals, even if unlimited sums of money were available, would prove an important factor in determining the rate at which progress can be made.

In addition to money and trained men, eradication also requires the proper education of livestock owners, on whom dependence must be placed more and more in the future, as the number of cleaned herds and areas increases to protect such herds and areas against reinfection. Without the aid, interest and good will of the livestock owners it is questionable whether a widespread, common, insidious, usually chronic, often long-concealed disease like tuberculosis can be conquered, as it is their authority through which the enforcement of many primely neessary measures must be secured.

The following important facts about bovine tuberculosis and its eradication should be widely published:

a. The bovine tuberculosis eradication work that is now being done is encouraging, and the results that are being obtained promise to be permanent.

b. The officers of the Federal and State cooperative tuberculosis eradication activities now are receiving more requests from cattle owners who desire to have their herds accredited free from tuberculosis than they can attend to with the men and money at their command.

c. The sooner bovine tuberculosis is eradicated the less the work will cost, and the sooner the losses it causes will stop.

d. The frequency of tuberculosis among the cattle of a country is closely proportioned to its number of cattle and the period of time the disease has been permitted to spread without a real fight to control it, and an effective fight is impossible without the use of tuberculin.

e. Before tuberculin was discovered tuberculosis probably had reached nearly, if not quite, its present frequency among European cattle, which is from three to five times as great as among American cattle. A comparison between our older and younger States shows that the percentage of tuberculous cattle is from 25 to 30 times as great in some of the older than it is in some of the younger.

f. Eradication of bovine tuberculosis in Europe, because of the much larger proportion of infected cattle, is a decidedly more difficult and expensive thing than it is in America. We should not permit the cattle in our older States to become as commonly infected as those of Europe, or those in our younger States in this respect to equal those in our older States. Indifference and dilatoriness will be perniciously effective in bringing about such undesirable conditions.

g. A half-hearted, poorly financed campaign against bovine tuberculosis is not sufficient, as it does not promise, to judge from experience, to remove existing cases and centers of infection as rapidly as new ones develop.

h. The losses caused by bovine tuberculosis may fall more heavily on some persons than on others, but they are finally paid by the people as a whole, as the disease increases the price of all beef and dairy and pork products. If the increases were payable in a lump sum, once per annum, in the place of being paid, as is now the case, in one or more daily installments, the eyes of those who are being taxed probably would open wide with wonder.

Recognizing the truth of these statements, and using them as a basis, the committee recommends that the following resolution be approved by the Association:

"*Whereas*, Bovine tuberculosis is a widespread and destructive plague of cattle and hogs, and is, moreover, responsible for many cases of tuberculosis among children;

"*And whereas,* The excellent work now being done to eradicate this plague is being hampered by lack of funds and for some time to come will require annually increasing sums of money to insure that it may keep pace with the requests received from cattle owners to have their herds cleaned and accredited free from tuberculosis:

"*Be It Resolved,* That the members of this Association, who may be assumed to be peculiarly qualified, through education and the nature of their work, to understand the conditions that affect the welfare of the animal industry and the prices of food products obtained from animals, believe it to be their duty to point out that it is urgently desirable that all Federal and State appropriations for the eradication of bovine tuberculosis should be annually increased, and that the annual increases should be sufficient at least to meet the growing demand of cattle owners for reasonable help to stamp out the disease in their herds;

"*Be It Further Resolved,* That this resolution shall have the widest possible distribution, either or both by being mailed to members of legislatures or by being published in livestock and agricultural journals."

The resolution should be distributed from the office of the President or Secretary of the Association, and if this requires some expenditure, an appropriation for the purpose is recommended and should be made.

The last annual report of the committee included a number of recommendations, the approval of which imposed special tasks on the committee of this year. The first deals with the intradermal use of tuberculin as a test for tuberculosis. Studies of the test were to be made and a questionnaire sent to all the members of the Association, and by such means it was hoped the needed information would be obtained for the preparation of a definition of what actually constitutes an intradermal tuberculin reaction. As no money was appropriated for the preparation and distribution of the questionnaire, the expedient of publishing it, with a request for attention, in the JOURNAL of the Association, was used. (See JOURNAL OF THE A. V. M. A., April, 1921.) Though it could not be expected that the expedient would yield as many replies as a questionnaire mailed separately to each member of the Association, it would be a serious matter if the meager number received could be looked upon as an index of the interest American veterinarians take in matters intimately and importantly related to the eradication of tuberculosis among domestic animals; and when you know that the total number of replies lacks one of being half a dozen, you will admit the truth of this statement. The committee takes pleasure in expressing its thanks to the five men who troubled themselves to show their interest in its questionnaire. However, it does not deem it advisable to draw and publish conclusions from so few reports.

Among veterinarians who have had considerable experience with the different methods of using tuberculin the belief is often expressed that it is urgently necessary that the method of making the intradermal test should be standardized, and that, if this were done, many errors now charged against it would be eliminated. The needles and syringes used, the amount and strength of the tuberculin injected, the examination and preparation of the skin before injection, the depth of the injection, the hours of examination, etc., all are factors of importance.

The approval of the intradermal tuberculin test by the Association as one of the means of detecting tuberculous animals is recommended.

The code for recording and reporting the results obtained by testing cattle intradermically with tuberculin, adopted by the United States Livestock Sanitary Association, should also be adopted by this Association, and it is recommended that this action be taken. Though

some objections have been made against the code, it is questionable whether they have sufficient weight to justify the confusion which would result from the adoption of different codes by the two most important American associations concerned with the protection of animals against infectious diseases.

Another recommendation made by the Committee on Tuberculosis at the last annual meeting is a revision of the report of the International Commission on the Control of Bovine Tuberculosis published in 1910 and the preparation of a primer on bovine tuberculosis. Whether this recommendation was to be construed as imposing a task on the committee of this year is a matter about which its members are not in full accord. The work, however, has not been undertaken, and if it is the intention of the Association to have it done it is recommended that a special revision and primer committee be appointed to do it.

Recommendations were also made by the committee of last year regarding so-called no-lesion tuberculin reactors. It is with considerable satisfaction that something can be said on this subject which may prove of interest. During the year ending June 30, 1921, the Pathological Division of the Federal Bureau of Animal Industry examined material obtained from 1,296 cases of no-lesion reactors, and found acid-fast bacilli in all respects like tubercle germs, in 258, or virtually 20 per cent. The material examined was mostly congested lymph glands and glands showing small hemorrhagic areas. Such glands are not uncommon in nontuberculous slaughtered animals, hence the significance of the proportion of cases in which tubercle bacilli were found should not be taken as proving that only one-fifth of the no-lesion cases have beeen satisfactorily explained, but rather as evidence that tends to justify the belief that so-called no-lesion reactors, with possibly rare exceptions, are infected with tubercle bacilli.

The insidious, chronic character of tuberculosis should naturally prompt us to draw the conclusion that a delicate, highly efficient diagnostic agent like tuberculin would detect a fairly large number of cases before the lesions had become gross enough to be visible to the unaided eye.

Consider how difficult it is to select material from no-lesion tuberculin reactors for microscopic study. A small fragment of tissue suffices for many preparations of the kind that can be examined under the high magnification required for the detection of tubercle bacilli, and the fragment, less than a grain, is part of an animal that rarely weighs less than several hundred and often more than a thousand pounds. To have proved, actually proved, that 20 per cent of 1,296 no-lesion tuberculin reacting cattle were actually infected with tubercle bacilli, if the difficulties in the way of obtaining the proof are duly valued, is either an astonishing technical achievement or the strongest kind of evidence to support the conclusion that most so-called no-lesion reactors are infected with tubercle bacilli and must be looked upon as dangerous animals that may sooner or later become spreaders of tuberculosis. Those who are inclined to doubt this interpretation should go to friends or acquaintances who have hunted tubercle bacilli in recognizable tuberculous lesions, and learn from them that their discovery in even such lesions too often is an eye-wearing, tedious, time-consuming task.

It may be interesting to say here that sensitization to tuberculin can be induced in cattle and small experiment animals by injecting them with dead tubercle bacilli, and that dead tubercle bacilli until recently were of not rare occurrence in tuberculin. Whether their abundance occasionally was sufficient to sensitize cattle that received large subcutaneous injections of tuberculin has not been determined.

Cattle can be sensitized also by drenching them with human tubercle bacilli, or by injecting them with lesions caused in guinea-pigs by human tubercle bacilli. Such bacilli, as is now well known, do not cause an active or a progressive tuberculosis in cattle. What the value of these facts may be in accounting for some no-lesion reactors can not be answered until further studies have been made.

The question has been asked whether an animal may be sensitive to tuberculin as the result of previous injections. The answer to this is that though many tests have been made with different species of animals, no one has succeeded in showing that injections of tuberculin sensitize an animal to subesequent injections.

As we well know, one of the disadvantages of the subcutaneous use of tuberculin is, wholly contrary to the sensitization of nontuberculous animals to subsequent injections, that it too often leads to the desensitization of tuberculous animals. Such desensitization, unless some means can be devised to give the slogan, "Once a reactor, always tuberculous" practical value, makes it possible for dangerous tuberculous animals to remain unrestrained and unrecognized and to serve as unsuspected disseminators of tubercle bacilli. The Association, or a committee appointed by the Association, should give this matter careful study, and seek means through which it can be determined with reasonable certainty when an animal is examined whether it has at any time reacted with tuberculin. The suggested committee, if appointed,—and its appointment is hereby recommended,—should not be the Committee on Tuberculosis, and the men selected for it should be well informed on practical methods of marking animals and should know how to obtain the support of livestock interests to further the use of a workable method for identifying dangerous animals.

Another resolution in the report of the committee of last year,—a report, by the way, that imposed a good many large tasks—recommended that a study should be made of the causes of the recurrence of tuberculosis in cleaned herds. Such recurrence is a subject on which probably any member of the committee could present a long dissertation, which, however, as it would contain little or nothing new, would be tedious rather than instructive. Two things are very important; one, that we should guard clean and cleaned herds against cattle that have become tolerant to tuberculin; and, two, that we should carefully study the cleaned herds under our supervision relative to the simple, discoverable means through which they may be reinfected. That a stream of water, for instance, may carry tubercle bacilli a considerable distance from an infected to a clean or a cleaned herd and lead to the development or recurrence of tuberculosis is a fact that has been experimentally proved. That flies, rats, mice, birds, currents of air, etc., serve as agents to spread tuberculosis has not been proved, though definite investigations to incriminate them have been made. It has been proved that flies that live in a tuberculous environment may harbor tubercle bacilli in and on their bodies, and that the same is true of rats, mice and birds which have ingested tubercle bacilli or tuberculous tissues; but if these were important causes for the spread of tuberculosis among cattle, it would not have been possible, as has been done at various places, to maintain actively tuberculous cattle on a small area with nontuberculous, without the spread of the disease from the former to the latter.

The Committee on Tuberculosis, which is clothed with the dignity reflected from the inclusion of a wholly superfluous adjective, "International," in its name, owes it existence to a recommendation made by the "International Commission on the Control of Bovine Tuberculosis" appointed by the Association in the year 1909. One of the principal functions of the committee, defined in the recommendation which called it into existence, was to report to the Association from

time to time the discoveries made by investigators engaged in the study of tuberculosis. It therefore seems pertinent and desirable that a few words should be said, before closing this report, about the claims made in the course of the year by Calmette and Guérin in France and Nathan Raw in England that they have succeeded in producing attenuated strains of tubercle bacilli which may prove, or are alleged to have proved, serviceable for use as immunizing and therapeutic agents in the fight against tuberculosis.

As early as the years 1894 and 1896, attention was called to an originally virulent strain of the tubercle bacillus which had become attenuated through growth on artificial culture media, and which was proved to induce a measurable degree of resistance against tuberculosis in guinea-pigs injected with it and subsequently injected with virulent tubercle bacilli.

A number of years later, as you will remember, we passed through the period of so-called bovo-vaccination against tuberculosis. Bovo-vaccination may be likened to the use of attenuated tubercle bacilli to obtain immunity against more virulent strains, as it required the injection of cattle with bacilli of the human type, against which they are normally resistant, to protect them against the bovine type, for which they are highly susceptible.

More recently we were subjected to the Friedman turtle-bacillus fiasco. The turtle germ, for which specific therapeutic qualities of an antituberculous character were claimed, was nothing more nor less, so far as we know, than a bacillus of the human type of very low pathogenic virulence which had been isolated from a turtle that had been exposed in a zoological garden to the expectorations of a human tuberculous individual. And, incidentally, it may be worth mentioning, after years of study and observation, a hot quarrel is still in progress in Europe concerning the value of Friedman's turtle bacillus as an agent for the treatment of tuberculosis.

The object of referring to this earlier work is to call to your minds that the use of attenuated, avirulent and aberrant or unusual strains of tubercle bacilli as immunizing and therapeutic agents is by no means new, and to justify the opinion that the claims made by Calmette and Guérin and by Raw, notwithstanding that these are men of the highest rank in the field of tuberculosis research, must not be lightly accepted as a final solution of our tuberculosis problems.

When we realize that tubercle bacilli may lie dormant, without losing their virulence or changing their character, for months and years in the bodies of animals for which they are not truly pathogenic, we may say: In Europe, if live tubercle bacilli can be used with a fair degree of safety to protect cattle against tuberculosis, because of the great frequency of tuberculosis among European cattle, it may be a reasonable expedient to use them. But in America, with its much smaller proportion of tuberculous cattle, it is to be hoped that we will resort to no method of control or eradication that requires the injection of living tubercle bacilli of any kind, type, degree of virulence or degree of attentuation, at least not until the injection of such bacilli has been proved by searching, exhaustive experimental studies to be, on the one hand, harmless, and, on the other, truly and economically beneficial. In America our aim should be total eradication, and no better path to this end has been defined than that along which our cooperative work between the Federal and State Governments is moving.

E. C. SCHROEDER, *Chairman.*
CHARLES E. COTTON,
CARL W. GAY,
M. H. REYNOLDS,
FREDERICK TORRANCE.

PRESIDENT WHITE: We have just heard a very valuable report from the International Committee on Bovine Tuberculosis. What shall be done with it?

DR. KIERNAN: I am in favor of the resolution and propose to vote for it. I merely rise to make the observation that I notice that less than half a dozen replies to the questionnaire were returned to the committee. I don't like to have the impression go out that that indicates the sentiment of the veterinarians on the tuberculin test. From October 1 to June 30, 1921, there were tuberculin tested by the subcutaneous method 251,000 cattle, of which 10,000 animals reacted; by the intradermic test 648,697 head of cattle, of which 24,554 reacted to the tuberculin test. The percentage of reactors by relative tests was relatively the same, indicating that the intradermic test is used quite generally throughout the United States. I hold no brief for either one. These are cold facts and figures for the work being done.

Another observation I wish to make is with regard to lesions. The report of July, 1921, shows that of 137,000 head of cattle tuberculin tested in cooperative work, 302 animals were found to disclose no microscopic lesions, representing 6.57 per cent of those showing no lesions. I think that will compare favorably with all the data that have been gathered annually from the beginning.

I move that the resolution be accepted.

(The motion was duly seconded and carried.)

AMENDMENT TO BY-LAWS

PRESIDENT WHITE: Is there any unfinished business?

SECRETARY MAYO: There is a minor change in the By-Laws that was proposed at Columbus last year. It was to change Article I of the By-Laws on the order of business, placing the reports of officers as No. 7, before the election of officers, instead of afterwards as it is at present. We have not followed this plan, but it is a minor change.

PRESIDENT WHITE: You have heard the statement of the Secretary in regard to this minor change in the By-Laws. What is your pleasure in regard to it?

Dr. COTTON: I move its adoption.

(The motion was seconded and carried.)

SPECIAL COMMITTEE ON PREVENTION AND CONTROL OF ANIMAL DISEASES

PRESIDENT WHITE: Is there any new business?

DR. CARY: I move that a special committee of not more than five members be appointed by the President to report at the next meeting of the A. V. M. A. on "The Prevention and Control of Animal Diseases," along the lines suggested by Dr. Munce in

his paper on that subject before the Section on Sanitary Science and Police.

(The motion was seconded and carried.)

PLACE OF NEXT MEETING

DR. ELIASON: Would it be appropriate at this time to extend an invitation to the Association for next year's meeting?

PRESIDENT WHITE: I presume it would not be out of order.

DR. FERGUSON: Last July, at the meeting of the Wisconsin Veterinary Medical Association, I was delegated to extend you an invitation to meet at Madison, Wisconsin, next year. It is needless for me to describe the advantages that you will have in meeting in Wisconsin. Nearly all of you are familiar with that State. The only question that might come up in your minds is as to having facilities to house you there, and I can assure you we have ample facilities to take care of every member and visitor if you decide to meet there. We can put up a program that will be of special interest to the practicising veterinarians. As you all know, Wisconsin is the leading dairy State in the Union, and Madison is so located that you may have the opportunity to look over some of the best bred and some of the best individual dairy cattle in the world. Dr. West, one of the local men in Madison, is famous for getting together a clinic. I can assure you that if you meet there no one will be dissatisfied with the size and the quality of the clinic that we can give you.

In behalf of the Wisconsin Veterinary Medical Association I extend the invitation to meet with us next year. (Applause.)

PRESIDENT WHITE: I do not believe it would be wise at this time to commit ourselves finally in regard to our next place of meeting. Personally, I am very much in favor of what the last speaker said, but we will receive invitations from other parts of the country and it would hardly be fair to them not to allow them to be heard. I understand that all of the representatives have not yet arrived. However, use your own pleasure in the matter and not mine.

DR. ELIASON: Just in further invitation from the city of Madison, and on behalf of the Board of Commerce and the Department of Agriculture, of which I am a part, we extend to you cordially an invitation to visit the city of Madison. We have one of the most splendid capitals in America, and we are so situated that we can give you a good time. Some questions have arisen as to whether we are equipped with hotel facilities. They are not elaborate, but I assure you that you will be taken care of. We have made arrangements so that we know just where we can be if you come. Every room in Madison has a bath. All you have to do is to bring your bathing suit. You can step right off into the lake. We have four lakes right in proximity to Madison. If you want to fish in the morning or in the evening facilities will

be provided so you may. I also extend, on behalf of the Governor, an invitation to visit our State.

DR. CARY: I move that this question be laid on the table until all the invitations are in.

DR. JENSEN: Could they not be presented at this time?

PRESIDENT WHITE: They are not all here.

DR. FERGUSON: Mr. President, it was not my intention to have this invitation accepted at this time. I wanted to get it before the members while they were all present.

DR. STANGE: I think perhaps an amendment would not be out of order. It seems to me the proper way to handle this would be to refer this invitation, together with any others that may be received, to the Executive Board. I move that this invitation, together with any others that may be received, be referred to the Executive Board for their action.

(The motion was seconded by Dr. Cary.)

PRESIDENT WHITE: Dr. Cary's motion to lay this on the table was not seconded, so Dr. Stange's motion holds.

DR. KOEN: I believe that Dr. Stange speaks correctly when he says that the meeting place shall be decided upon by the Executive Board, but I believe that it has been the custom in previous years to give the Association an opportunity to express its preference. I don't think that it is fair to those who are here or to the people that have invited us to Madison and Wisconsin to refer this invitation to the Executive Board without an opportunity of the members assembled here to express their preference. If this motion can be so amended that this Association or convention shall have an opportunity, before it adjourns, to express its preference in the matter, then I am satisfied to let it go over; but I don't believe the motion should carry to dispose of Madison finally by referring it definitely to the Executive Board. I hope that the question will be voted down.

DR. CARY: I would like to call for the reading of the Constitution and By-Laws on this question.

(Secretary Mayo read from the Constitution and By-Laws governing meetings of the Association.)

DR. JENSEN: I am mighty happy that for once I can agree with Dr. Koen. This idea of everything being referred to the Executive Board reminds me of the fact that somebody called it the executing board. I believe we should have a little voice in this matter.

DR. KIERNAN: Since 1910 when this question was discussed in New York as to whether the date and place of the meeting should be fixed by the Executive Board or the membership the question has never arisen, but the Association has the perfect right to fix the place for holding the meeting. As I understand this, it is not for the Executive Board to dispose of the matter, but to give opportunity to others to extend invitations to hold the meeting

next year. There are other places that have in mind extending an invitation to this Association, but they understand it is handled by the Executive Board. Wisconsin has an equal opportunity with any other city or State before the Executive Board. I think that is fair enough.

DR. KOEN: All these other towns have had an equal chance with Wisconsin to extend an invitation. I am not asking at this time that the other cities that want to invite us be not given an opportunity, but I do ask that Dr. Stange's motion be voted down in order that the convention may have opportunity to voice its preference as to where we shall meet. If Dr. Stange's motion carries, this Association shall have no voice in the matter whatever, but all the other invitations that come will be referred to the Executive Board.

DR. CARY: I move we postpone this until all the invitations arrive.

(The motion was seconded.)

PRESIDENT WHITE: Is that an amendment to the motion or a substitute motion?

DR. CARY: I move that this question under discussion be postponed until all the invitations have arrived. I suppose it is an amendment.

DR. JENSEN: I would like to see embodied in that motion a provision that this be decided by the Association and not by the Board.

PRESIDENT WHITE: The motion comes on the amendment by Dr. Cary.

(The amendment was carried.)

PRESIDENT WHITE: Now we will vote on Dr. Stange's motion as amended.

(The motion as amended was carried.)

Adjournment.

NEW COMMITTEES OF THE A. V. M. A.

The following appointments have been made by President A. T. Kinsley:

Committee on Legislation.—J. G. Ferneyhough.

Committee on Resolutions.—D. M. Campbell, chairman; C. H. Stange, V. A. Moore, Geo. H. Glover, R. R. Dykstra.

Audit Committee.—R. P. Marsteller, chairman; O. J. Kron, G. A. Scott, A. Lockhart, J. V. Lacroix.

Committee on Necrology.—H. E. Bemis, chairman; J. W. Connaway, A. H. Baker, W. B. Craig, G. A. Johnston.

Committee on History.—J. W. Adams, chairman; R. C. Moore, G. H. Berns, T. H. Edwards, C. D. McGilvray.

Committee on Anatomical Nomenclature.—S. Sisson, chairman; H. S. Murphey, Mark Francis, Earl Sunderville, F. W. Chamberlain.

International Committee on Bovine Tuberculosis.—J. A. Kiernan, chairman; Luis Santa Maria, F. Torrance, C. E. Cotton, W. T. Spencer.

Committee on Abortion.—C. P. Fitch, chairman; E. C. Schroeder, F. M. Hayes, A. Eichhorn, T. H. Ferguson.

Committee on International Veterinary Conference.—J. R. Mohler, chairman; A. Eichhorn, L. A. Merillat, David S. White, V. A. Moore, F. Torrance.

Salmon Memorial Committee.—S. Brenton, chairman; H. Preston Hoskins, J. R. Mohler, J. G. Rutherford, H. M. Graefe.

Liautard Memorial Committee.—J. F. DeVine, chairman; W. H. Lowe, W. G. Hollingworth, A. D. Knowles, W. H. Dalrymple.

Committee on Emblem.—S. E. Bennett, chairman; R. F. Bourne, J. F. McKenna.

Committee on Prevention and Control of Animal Diseases.—H. W. Turner, chairman; L. G. Cloud, U. G. Houck, G. H. Hart, I. E. Newsom.

Representatives on Revision of Narcotic Law.—J. P. Turner, chairman; R. R. Clark.

Representative on Board of Managers, Horse Association of America.—Geo. A. Dick.

Representative American Research Council Committee.—L. W. Goss.

NEW MEMBERS

Membership cards have been sent to all the newly elected members together with an application blank and a letter urging them to make a special effort to get a new member. With their enthusiasm for the A. V. M. A. we are expecting good returns. How many members will make a personal effort to get one veterinarian to join our association? It would double our membership.

The Secretary has written to some English veterinary journals calling attention to the advantages of joining the A. V. M. A., and it is hoped that some of our confreres on the other side will respond.

The Secretary has received a letter from Dr. Gabriel Malda, Secretary of Public Health of Mexico, thanking the A. V. M. A. for courtesies extended to Dr. Luis Santa Maria, the official delegate from the Republic of Mexico to the Denver meeting. Dr. Santa Maria joined the A. V. M. A. at that meeting.

An application for membership has been received from Dr.

J. E. Aghion Bey, Principal Veterinary Officer, State Domains, Sakha, Egypt. He is a graduate of the Ontario Veterinary College in 1907.

VETERINARY ASSOCIATION OF MANITOBA

A special meeting of the members of the Veterinary Association of Manitoba was held in the Royal Alexandra Hotel, Winnipeg, Tuesday evening, September 27, 1921, for the purpose of discussing questions of importance to the livestock industry and also Dominion-wide registration of veterinary surgeons in the Dominion of Canada, and for the appointment of a delegate to attend a conference of veterinary surgeons to be held in Ottawa in November.

The chair was occupied by the President, Dr. F. W. Bryant, and the following members were present: W. J. Hinman, R. A. McLoughry, W. A. Shoults, W. Hilton, J. A. Stevenson, J. A. Munn, H. R. McEwen, N. V. James, H. Bradshaw, A. L. Alton, G. B. Miller, G. A. Bowman, W. A. Hilliard, J. G. MacDonald, H. C. Storey, H. Colebourn, J. W. Smith, S. H. Kesten and J. B. Still.

A lengthy discussion took place regarding matters of importance to the livestock industry and the Dominion-wide registration of veterinary surgeons. It was moved by Dr. Hinman, seconded by Dr. Bradshaw, that a committee composed of Dr McLoughry, Dr. Shoults and Dr. Bryant draft a resolution embodying the sense of the feeling of the meeting for the guidance of the association's delegate who was to be detailed to attend a conference of veterinary surgeons to be held in Ottawa during the month of November. This motion carried, and the meeting then took a recess while the committee drafted the resolution. On reassembly the resolution was presented, and on being put to a vote it was carried.

Dr. J. A. Munn of Carman, who was elected as the Association's representative on the Dominion Advisory Board on Veterinary Education at the last annual meeting, was asked to represent the Association as their delegate and was furnished with the foregoing motion for his guidance. Dr. Munn assured the members that he would comply with the resolution and do everything possible in the best interests of the veterinary association and the profession at large.

On motion of Dr. McEwen, seconded by Dr. Stevenson, the President, Dr. F. W. Bryant was selected as an alternative delegate, in the event of anything arising to prevent Dr. Munn from attending the conference. J. B. STILL, *Secretary.*

CALIFORNIA STATE BOARD OF EXAMINERS

The State Board of Examiners of California held a meeting in Los Angeles on October 20, at which time a class of eight took the examination, four of whom passed.

The four passing were graduates of the following colleges:

Two from Washington State College, one from Chicago Veterinary College, one from Indiana Veterinary College.

Of those failing one was from McKillip Veterinary College, one from Chicago Veterinary College, one from Kansas City Veterinary College, one from Western Veterinary College.

JOHN L. TYLER, *Secretary.*

CENTRAL MICHIGAN VETERINARY ASSOCIATION

Tuberculin tests in cattle formed the subject of talks by several speakers at the meeting of the Central Michigan Veterinary Medical Association, held at the Jackson City Club on October 14. The meeting was one of the most successful and profitable ever held by the Association. Approximately 50 members were in attendance.

Dr. B. F. Killham, State Veterinarian, spoke on the work of the new State agricultural department, and the methods used in dealing with bovine tuberculosis. Dr. J. A. LaCroix, Chicago, editor of the *North American Veterinarian,* spoke along similar lines, while Dr. C. C. Mix, of Battle Creek, took for his subject the economic value of tuberculin testing.

Dr. C. C. Clement, of Hudson, gave a synopsis of the early days in tuberculin testing, and drew a verbal picture of the remarkable progress which has been made. The speaker was one of the charter members of the Michigan Veterinary Association, which was organized in 1883. The progress of the State Association was outlined by Dr. Rummels, of Lansing. He reported that 48 applications for membership had been received during the past year.

Centralized killing of livestock was advocated as an economic

necessity by Dr. H. H. Sparhawk, of the Detroit Board of Health. He stated that the State metropolis has 100 abattoirs under inspection, and that all meat was inspected and stamped before entering the city. He declared that 2,000 pounds of veal had recently been condemned because the calves had been slaughtered before they were two days old.

That the pronounced increase in hog cholera in the State is due to improper vaccination and use of virus was the opinion expressed by Dr. Newton, of Lansing.

Other speakers were Drs. A. L. Curtis, of Hillsdale; A. Z. Nichols, Pittsford; and R. S. Johnston, bacteriologist of the State Board of Health.

Dr. H. L. Roberts, meat and milk inspector in Jackson, acted as toastmaster at the banquet which followed the discussions.

W. N. ARMSTRONG, *Secretary.*

PHILADELPHIA VETERINARY CLUB

The regular monthly meeting of the Philadelphia Veterinary Club was held on Tuesday evening, October 25, at the Veterinary School, Philadelphia, Pa.

Dr. J. A. Kolmer, Laboratory of Dermatologic Research, University of Pennsylvania, addressed the Laboratory Section on "Some Phases of the Complement Fixation Test."

The regular club meeting was an open meeting. No special subject was on the program. Several of the members reported on cases that they had treated, which called forth interesting discussions, and much valuable information was obtained in general.

We had an exceptionally large attendance.

C. S. ROCKWELL, *Secretary.*

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION

The next meeting of the California State Veterinary Medical Association will be held at Davis, California, from January 2 to the 7th, inclusive, 1922. This will be a practitioners' short course held at the College of Agriculture of the University of California and it is expected to be even more successful than any held heretofore.

Particular stress will be laid this year on diseases of cattle. Dr. D. H. Udall of the Cornell Veterinary School will be the principal lecturer on this subject. Other prominent men who will deliver lectures during the Short Course are: Thomas F. Hunt, Dean of the College of Agriculture; Elwood Mead, Professor of Rural Institutions; B. H. Rawl, formerly Assistant Chief of the United States Bureau of Animal Industry; G. H. Hecke, State Commissioner of Agriculture; J. P. Iverson, Chief of the State Bureau of Animal Industry, and others.

JOSEPH M. ARBURUA, *Secretary.*

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The Board of Trustees of the Pennsylvania State Veterinary Medical Association has authorized the announcement that the 1922 meeting will be held in Harrisburg, Penna., Tuesday and Wednesday, January 24th and 25th.

Every effort is being made to have the 1922 meeting as attractive to practitioners as the 1921 meeting proved to be. The assistance of the practitioners of Pennsylvania, who have organized local Veterinary Clubs throughout the State, is being enlisted. At the present time almost every veterinarian in the State belongs to one of the eight clubs now meeting regularly.

Each Veterinary Club has been asked to select one of its members to present a paper of interest to the practitioner and two additional men to open the discussion of the paper. Many of the clubs have notified the Secretary that their men have been selected and keen rivalry for the presentation of the best paper insures an excellent program.

The Pennsylvania State Veterinary Medical Association has, for the past few years, been a member of the Allied Agricultural Associations. All associations of this alliance meet in Harrisburg at the same time each year. Joint sessions are held at least two evenings during the week, and the interest that livestock owners take in the veterinary meeting frequently places standing room at a premium.

The close contact between the veterinarian and the livestock owner, during this Agricultural Week, is a very valuable factor in placing the veterinarian in proper relationship with his client.

Holding the meeting in Harrisburg also has the advantage of bringing the practitioners in close contact with the Pennsylvania Bureau of Animal Industry officials. Livestock owners cannot help but be impressed with the cordial relationship that exists between the practitioners of this State and the Bureau of Animal Industry. This not only strengthens the position of the Bureau, but reflects to the advantage of the practitioner.

Every member is urged to attend the 1922 meeting, and visiting veterinarians are assured of a cordial welcome.

R. M. STALEY, *Secretary.*

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION

The Western New York Veterinary Medical Association will hold its seventh annual meeting Thursday, December 15, 1921, 1:30 p. m., at the S. P. C. A. Hall, 121 W. Tupper Street, Buffalo, N. Y. There will be a good clinic before the business meeting. Election of officers for the coming year will be held and a noted veterianian will address the association in the evening. F. F. FEHR, *Secretary.*

Postal cards for nominating a member of the Executive Board from district No. 6 were mailed from the Secretary's office on October 18th. Nominating cards were only sent to those members who have paid their dues for the current year.

The fourteenth annual conference for veterinarians will be held at the New York State Veterinary College at Cornell University, Ithaca, N. Y., January 12 and 13, 1922. The program will be of especial interest to practitioners.

The thirty-fourth annual meeting of the Iowa Veterinary Association will be held on January 17, 18 and 19, 1922, at the Hotel Savery, Des Moines, Iowa.

The Pennsylvania State Veterinary Association will meet at Harrisburg, Pa., on January 24 and 25, 1922. R. M. Staley, Philadelphia, Pa., Secretary.

The Northern Tier Veterinary Club will meet on February 9, 1922, at Williamsport, Pa. F. B. Mayer, Canton, Pa., Secretary.

COMMUNICATIONS

THE OCCURRENCE OF FIVE LUMBAR VERTEBRAE IN THE MORGAN HORSE

To the Editor:

In the September issue of this JOURNAL, the Editor asks our veterinary anatomists whether they have any information regarding the occurrence of five lumbar vertebrae in the Morgan horse, a subject lately discussed in the *National Stockman and Farmer.*

I am not a veterinary anatomist in the sense of being a teacher of that branch of our science. But I think this question concerns equally the hippologist, perhaps even more so from its practical aspect in relation to the history of the horse, his external conformation, equitation, horse-breeding, etc. I shall, therefore, gladly contribute to the knowledge asked for by making a few brief statements of observations and facts relative to the subject under dispute.

As an introduction into the question the fact appears as fundamental that the fossil remains of horses show already anatomical variations in the process of the evolution of the horse. A study of such specimens in the Museum of Natural History, here in New York, proves that the earliest three-toed horse has eight lumbar vertebrae; a three-toed specimen of a later period has seven; a still more advanced three-toed horse has but six. The fossil Scotti horse of Texas has six lumbar vertebrae. Of present horses the skeleton of a Percheron has six and a giant cart horse has six, both representing the Forest type of Europe. The Thoroughbred "Sysonby," artistically mounted at running speed, has six lumbar vertebrae, but the transverse processes of the sixth lumbar vertebra are very short on both sides. The Arab stallion Nimr, representing the Desert type of horse, has only five lumbar vertebrae. Of other Equidae the "Wild Ass" (*Equus kiang*) of the high plateaus of Thibet has but five lumbar vertebrae, and while classed among asses is closely allied to the horses. Grant's zebra (*Equus burchelli*) has six lumbar vertebrae, but the sixth vertebra has a much narrower spinous process and much shorter transverse process than the preceding five lumbar vertebrae.

The evidence shown by these specimens in this Museum of

Natural History, which has the most complete, best arranged and most artistically finished collection of equine skeletons in this country or in Europe, is interesting in various directions. It is almost conclusive as to the fact that the Forest type of horse tends to have six fully developed lumbar vertebrae, whereas the Desert type tends to have but five. Personally, I have never seen, heard or read of the occurrence of five lumbar vertebrae in a horse of pronounced draft type, whereas it is not uncommon in horses of the light mixed breeds.

Just as interesting is the apparent fact that the various skeletons strongly indicate the existence of a tendency to eliminate the sixth lumbar vertebrae in breeds used under the saddle. In investigating the course nature takes to perform this task, it is evident that the process starts by first reducing the transverse and spinous processes of the sixth lumbar vertebra to a more or less rudimentary state, followed up by anchylosis with the lumbar processes of the fifth lumbar vertebra, resulting in one misshaped wing of irregular form. I have noticed such specimen every now and then for many years past. In the museum, here in New York, this process is well illustrated in a skeleton of a Shetland pony which shows complete anchylosis of the transverse processes of the sixth and fifth lumbar vertebrae on the left side and a partial confluence on the right side.

That the Thoroughbred frequently has only five lumbar vertebrae is quite well known. Those army veterinarians who visit the Cavalry School at Fort Riley, Kansas, can see there for themselves in the lecture room a skeleton of a Thoroughbred which has only five lumbar vertebrae *and* a pedigree dating back to Darley Arabian as shown by the school records. There is a legend at that school that Drs. Plummer and Jewell were fishing in the vat a long time for the sixth lumbar vertebra. In many and long rides in the Southwestern prairies and along the Mexican border I have quite often observed five lumbar vertebrae in prairie skeletons of the original Texas broncho (Mexican pony) which as history tells us were of Spanish-North African descent.

From the facts elicited above, it should not be considered extraordinary to find five lumbar vertebrae in some Morgan horses. It is undoubtedly a mixed breed, although Justin Morgan, the founder of the breed, is described as 14 hands high, off an Arab sire and dam, was used in the Revolutionary War as a

charger and later matched for trotting races under saddle, yet he was mated to many mares of unknown ancestry. The cross-breeding of the two original types of the Forest horse with the Desert horse, practised for many hundreds of years past in Europe, has produced numerous mixed breeds, retaining either predominant characteristics of one or the other or blending both. Our own horse population is as heterogeneous as is our human population, a veritable equine melting pot. In this way the evolution of the horse is still going on.

It is another question, however, to conclude forthwith from the occurrence of five lumbar vertebrae that a horse is of pure Arab descent. It does constitute one strong indication in that direction, but one only. Chief among other anatomical differences, the skull of the horse should be examined. The Arab skull is decidedly brachycephalic with high and prominent eye sockets. An equally strong indication is found in the construction of the ulna of the Arab, which, while rudimentary, is still running along the radius, while in the Forest type it is never more than a splint. To finish, the very high sacrum of the Arab and its connection with a pelvis approaching a horizontal, should not be excluded from this search if it is intended to trace the ancestry of a horse by osteological evidence. Our veterinarians can help along our breeders in this respect.

In discussing this question the other day with a breeder of draft horses, he said: "Why in the world do these Morgan people make so much fuss about those five lumbar vertebrae? I cannot see any value or superiority in it, and I don't think they know any more about the bones of the horse than I know." Now, I have been acquainted with many horse breeders, and among them a few breeders of Morgan horses, and found among them several who were sticklers on facts of anatomy, zoology, archaeology and what not. True, most of the practical breeders care little about anatomical variation, etc., but the occurrence of five lumbar vertebrae proves to them their contention that a horse with a *short,* strong loin has the capacity to carry greater weight with less fatigue than a horse with a long back. All experienced riders sustain this contention. It means, therefore, a good advertisement, somewhat mystic but quite fetching.

While this contention of practical horsemen and breeders is perhaps of more or less empiric origin, we ought to help them

by showing that it has also a firm scientific foundation. In the study of statics and mechanics of the skeleton of the horse, physiologists and hippologists have long ago found it helpful to compare the construction of the vertebral column with bridge-work. They explain that the cranial bridge-pillar is formed by the thoracic vertebrae with their ribs, sternum, neck, skull and anterior extremities; while the caudal pillar is made up of sacrum, pelvis and the posterior extremities. The obliquely ascending trusses of a bridge are represented by the spinous processes of the dorsal vertebrae which slant from forward to rear and again slant from rear to forward towards a centerpiece. The vertebrae constitute connecting links sustaining principally horizontal pressure, as the pressure (of weight) drives from the middle towards both ends, and the weight is diverted in the living horse from the 14th-16th dorsal vertebrae, forward and backward, being finally transmitted toward the bridge-pillars, *i. e.*, the extremities. Elasticity is largely secured by the convexity of the lumbar curvature. If we look at the profile of a skeleton of a horse, it is easy to follow this explanation. Furthermore, in comparing a skeleton of an Arab having five lumbar vertebrae with that of a draft horse having six, the greatly more compact structure of the former and consequent ability to carry weight is at once apparent. Whether the cause of this variation in structure is due to physiological adaptation of the Arab from centuries of use under saddle as some physiologists maintain; or whether the short, strong loin of the Desert type of horse is original and produced by environment, as zoologists maintain, is an academic question not yet agreed upon by scientists. In fact, there is much more to be seen and to explain in these skeletons if we follow this matter up to an end. This, however, would lead us also into a study of the behavior of the center of gravity, center of motion and other physical phenomena of the living horse not here under discussion, so that it is better to close at this point. To army veterinarians, who are required to deliver instruction in hippology, I recommend the perusal of my article on "The structure and function of the horse's back and their relation to the form and use of the saddle," published in 1910 in the *Journal* of the U. S. Cavalry Association, where all these points are considered in a popular essay.

OLAF SCHWARZKOPF.

HORSES, TRACTORS AND TRUCKS

To the Editor:

Your people have a direct, financial interest in the maintenance of horse use, for it means lower production costs, essential in the readjustment now taking place.

The investigations of the Department of Agriculture and the colleges of agriculture in Illinois and Minnesota, indicate that on farms where tractors have been purchased, the number of horses displaced ranges from one-fifth to one-fourth; but if we were to grant, for the sake of argument, that they might displace one-third of the horses on farms over 100 acres by the purchase of one tractor for each such farm, we would have to buy 2,673,345 tractors, this being the number of farms of that size at the time the 1920 census was taken.

Government figures released July 22, 1921, on the number of tractors manufactured and selling price thereof to wholesalers, retailers and jobbers, show the average selling price by manufacturers to be $993 each. Adding 25 per cent the customary difference between manufacturer's price and price to farmer, we have an average cost of $1,241 per tractor; but if we concede lower prices and put the tractors in at $1,000 apiece, it means that we would have to spend $2,673,345,000.

Seventy-five per cent of the improved acreage of the United States is in farms of 100 acres or over. It is a fair conclusion that approximately 75 per cent of the horses and mules are to be found on such farms, or 19,194,808 head, and the displacement of one-third of these would mean the displacement of 6,398,269.

The census figures released July 29, 1921, give the total valuation of horses and mules at $2,562,075,481; 75 per cent of the horses and mules on farms of 100 acres or over, as per above assumption, will give us a valuation of $1,921,556,610 for all horses and mules on such farms. If we grant, then, that the use of tractors might displace one-third of the horses and mules, it would displace horses and mules valued at only $640,518,870; and it must not be forgotten that tractors do not last as long as horses.

In other words, such a shift can not possibly be considered an economic one, for it would displace animal motive power units valued at a little over $640,000,000 with mechanical motive power units costing more than $2,673,345,000, or more than four times as much.

Tractors last from 3 to 5 years. Horses have an average working life of 12 years on farms, after going into work as 3 year olds, and all the argument, all the selling propaganda that can ever be put over by the tractor and truck manufacturers can never shift such a tremendous economic obstacle as is involved in a change that would require the farmers of this country to spend more than four times as much in original investment for mechanical power units that would not last half as long. BUSINESS INTERESTS OF THIS COUNTRY CAN NEVER BENEFIT BY SUCH A CHANGE, for it will simply mean that farmers will pay eight times as much for their motive power as they are now paying.

The argument of the tractor man that it costs more to feed horses and mules than to buy gas, oil and repairs for a tractor, is not correct. Horses and mules displaced under such a shift can be maintained today for less than the cost of oil, gas and repairs for tractors. Furthermore, no saving in labor is effected; no larger crops raised. (See Bulletin 231, Illinois Experiment Station, for further details on this point.)

What I have said of tractors applies in the same measure to trucks. Road hauling requires on the average, on Corn Belt farms, only 25 to 30 days' work per year with one man and team, most of which comes during the fall and winter when farm horses would otherwise be idle. There is further argument in the comment of Thomas Clark, one of the most successful farm managers in America, who is in charge of Delchester Farms at Edgemont, Pa. He has tried both trucks and tractors. He has discarded them both; tractors for reasons given above; motor trucks because, as he says, "If good judgment is used in arranging the farm work, all road hauling can easily be handled by the teams when they are not needed in the fields."

The automobile is an entirely different question. We recognize that it gives a wide range of travel to families and that it is bought primarily for pleasure purposes. It may be used, and is used to a measure, for business, but the controlling factor in its purchase is, in ninety-nine cases out of a hundred, pleasure. Men do not stop to count the cost of their pleasure; if they did, there would be fewer divorces.

WAYNE, DINSMORE, *Secretary,*
Horse Association of America.

AN EXHIBITION IN MISSISSIPPI

To the Editor:

An interesting exhibit was gotten up by State and Bureau officials for educational purposes at the Mississippi State Fair held at Jackson, Miss., October 17-22. The exhibit consisted of a miniature dipping vat and horn-fly trap constructed by Dr. Flavus Weaver; representation of tick-infested and tick-free cattle; hog cholera control display; pictures of beef and dairy cattle; infected paspalum grass; tuberculosis specimens and equipment necessary in applying the tuberculin test. During the week hundreds of people visited this exhibit and it is believed that a great deal of good has been accomplished along the lines of tuberculosis and tick eradication and hog cholera control. We feel that much credit is due to Dr. Hugh L. Fry, in charge of hog cholera control work in this State, for his assistance in getting up this exhibit.

HUDSON C. CHADWICK,
Executive Livestock Inspector.

GERMAN SAVANTS ON TUBERCULOSIS

At the recent German tuberculosis congress, held at Bad Elster, the question of immunity was discussed by Prof. Isaac von Wassermann and by Dr. Neufeld, rector of the Robert Koch Institute. Both announced, as reported in the London *Times,* that they have come to the conclusion that there is no immunity against tuberculosis in the sense in which it is understood in regard to smallpox, measles and some other infectious complaints. They stated that in their conclusions "we must entirely abandon the hope of protection or precaution against tuberculosis by tuberculin or by injecting tuberculosis bacilli. In all cases of immunity, such as diphtheria and smallpox, we have only done what nature does. Against these nature created prophylactics, but did not do so in the case of tuberculosis. Therefore it is no good searching for new tuberculin. On the other hand, we might very well hope that some chemical substance would be discovered that would attack the tuberculosis bacilli."

According to the report of the German imperial slaughterhouses and meat-inspection offices, during the second quarter of 1919 the meat of 3,642 dogs was subjected to inspection, 2,301 in Saxony alone.

NECROLOGY

The community of New Rockford, N. D., is mourning the death of one of its most beloved and well-known citizens in the passing away of Dr. Charles H. Babcock, death following a week's illness from appendicitis. When he became ill he was immediately taken to the hospital, but it was found that his condition was such that an operation was impossible.

Charles Henry Babcock was born on October 16, 1865, his funeral taking place on the anniversary of his fifty-sixth birthday. He went to New Rockford in 1902 and for several years was a member of the drug firm of Babcock & Bucklin, later taking a course in veterinary medicine, which profession he has followed since. He was appointed as a member of the State Veterinary Medical Examiners' Board by Governor Burke, and has held that position ever since by appointment of Governor Hanna and Governor Frazier. He had been secretary of the board for several years past, and was also a member of the A. V. M. A. He found time to devote much work to the civic bodies of New Rockford. He had been a member of the Board of Education of that city for several years, and this year was acting as its president and had also served on several other civic improvement bodies.

A charter member of Zion Commandery, Knights Templar, he served as its eminent commander for several years; he was also a past master of Century Lodge, No. 60, A. F. & A. M.; past worthy patron of the Eastern Star and a past master workman of Century Lodge, No. 60, A. F. & A. M. To these positions he brought the thorough, conscientious work characteristic of him, and his influence, advice and good judgment have always been for the best interest of the organization of public bodies on which he has served. He was a member of Carrington Chapter, Royal Arch Masons, and of El Zagal Temple, Nobles of the Mystic Shrine.

During his work for the State board he had been in practically every community in the State, and in each had made those with whom he came in contact his warm friends by his exceptional manner, his conscientiousness and his unselfish regard for the welfare of others. He was a man among men; a helper to the unfortunate in time of need; a wise counselor and a true friend.

Dr. S. W. White, aged 81, for 30 years a veterinary practitioner at Charlottesville, Va., died at the home of his daughter, Mrs. L. H. Snow. He had been an invalid since last January. Dr. White was a native of Kilbourn, Ohio, where he married Mrs. Margaret Cummings, who died 19 years ago. He went to Virginia in 1879, locating at Kents Store, Fluvanna County. Besides his daughter, he is survived by three stepchildren.

The inventor of the pneumatic tire, G. B. Dunlop, who died recently in Dublin, Ireland, at the age of eighty-five, was a veterinarian. He was a native of Scotland. It is said that he conceived the idea of the pneumatic tire while making a tricycle for his little boy.

The cattle industry of Paraguay is passing through a serious crisis as a result of the suspension of operations by the American meat-packing plants. The ranch owners feel that the only way to relieve the situation is to export their cattle to Argentina. However, as the Argentine cattle market is also passing through a similar crisis, the prospects for relief of the situation are not bright.—*Wichita Daily Stockman.*

Hog cholera is becoming quite prevalent throughout the State. In many counties losses due to this disease have run as high as $10,000 in the last month.—*Iowa Farmer.*

The Missouri legislature has enacted a law requiring that after January 1 next, any herd of cattle containing 5 or more cows must be tuberculin tested and found free from the disease before milk can be sold from the herd. The test will be made by State or Federal officials free of charge to herd owners.—*Wallaces' Farmer.*

An English veterinarian reports to *The Veterinary Record* an unusual case of foreign bodies in a bull's rumen. The animal was "not doing well" and was slaughtered. In the rumen were found two large iron wedges used for splitting wood and a collection of iron bolts, nuts and screws numbering over a hundred. The owner had been making some repairs to his house and premises, and a barn to which the bull had access had been used as a workshop.

MISCELLANEOUS

DR. DUNCAN McEACHRAN AN HONORED GUEST

On October 13 there assembled a gathering of veterinarians in the vice-regal suite of the Ritz Carleton Hotel in Montreal to tender possibly the highest tribute that has ever been paid to a living veterinarian. This gathering during the centenary exercises, celebrating the founding of McGill University in Montreal, was a complimentary dinner given to Dr. Duncan McEachran by the graduates of the old Montreal Veterinary College, which was later adopted by McGill University as its Faculty of Comparative Medicine and Veterinary Science. The school was established in 1866 and was the third on the North American Continent, yet the first to adopt and maintain a three-year course. It was discontinued in 1903, as Dr. McEachran found it impossible to continue its operation at such a great personal sacrifice, no provision having been made by the university for its financial support and the Province of Quebec contributed but a very small sum for its maintenance.

Sixty of the three hundred and twelve graduates assembled from widely separated points as an expression of their homage to one of the pioneers of veterinary education on the North American Continent, who has the distinction of establishing, through his high ideals, the first veterinary school to maintain a three-year course. From the most remote points were: Drs. Lamb, of Denver; Darling, of St. Louis; Fahey, of Waycross, Ga.; Tamblyn, of Calgary, and Townsend, from New Glasgow, Nova Scotia. These, with others from less distant points, joined to do homage to an octogenarian and renew old associations.

The chairman for the occasion was Dr. Fred. Torrance, Veterinary Director General for the Dominion of Canada.

The chief tribute of the guests was presented by Professor V. A. Moore, Dean of the New York State Veterinary College at Cornell University; although not a graduate of the school, he has been associated with Dr. McEachran in many investigations of a scientific character, as well as a warm personal friend. This masterly address was ably seconded by Dr. W.

Reid Blair, a graduate of McGill, who is presently engaged as a scientific expert on the maintenance of wild animals in captivity by the Zoological Gardens, New York.

Dr. Moore gave a scholarly address, concerning himself with the important functions of his profession in order to more fully convey to Dr. McEachran the deep sense of appreciation with which he is regarded by the members of his calling. He reviewed the history of the institutions over which Dr. McEachran had presided, saying there could be no compliment more expressive of the high esteem with which the doctor is held than such a gathering of distinguished men from many States and provinces. Likewise there could be no testimonial more acceptable than to be assured that his labors were appreciated and that his graduates have played a worthy part in the development of the veterinary profession of America.

Dr. Blair, in tendering his appreciation, spoke of Dr. McEachran's ungrudging eagerness to be helpful. He had never looked upon the classroom as a task, but as an opportunity of imparting his own zeal and store of knowledge. Dr. Blair spoke of the economic value of veterinary science and its benefit to mankind, and said that the field of veterinary medicine was not one of commercial exploitation, but one of service.

Dr. McEachran was given a rousing welcome as he rose in reply to the toast. In expressing his pleasure at the invitation to attend the dinner, he remarked that the Macs are all clannish, and it would not have surprised him a bit if in that gathering of the Sons of Old McGill someone had got up and asked them to drink that old but extremely modest toast,

"Here's to oor ain sel's—wha's like us?"

The speaker referred to a gathering in Boston on January 19, 1896, when the Massachusetts Alumni of the Department of Comparative Medicine of McGill University met at the Quincy House, and the reporter of the Boston *Globe* of the following day referred to them as "All healthy, hearty-looking men." In reminiscent mood, he recalled that the reporter had referred to the ease and dignity with which he carried his years. "Why, I was a young fellow then and I am not an old fellow now," a sally greeted by a roar of applause.

Proceeding, Dr. McEachran said: "Institutions of learning may be built, equipped and endowed by the large-hearted liberality of benefactors, yet if their graduates forget their duties to Alma Mater enduring progress cannot be made. I am not going to presume to lecture in this after-dinner speech on these duties, yet one cannot help taking advantage of such an opportunity of speaking to such a representative gathering as this, to say a few words on this subject. Graduates should feel that they are a part of the university, that they ought to continue to take an active interest in her affairs and have their views on all important matters expressed by their representatives. Each individual graduate should ever keep before him the feeling that his professional standing, his research work and contributions to science reflect credit on his college."

The prefix "Old" is in one sense at least no longer applicable, said the speaker, referring to the noble pile of new buildings. He hoped that the day is not far distant when the Faculty of Comparative Medicine will be restored and endowed in a manner proportionate to its importance scientifically and practically. "I cannot refrain from remarking," he said, "that one of the greatest blunders ever committed in the management of McGill University was allowing that faculty to close its doors for want of necessary financial support."

After reviewing the incidents of the past year, Dr. McEachran closed by saying: "Let me conclude by thanking you for this crowning compliment of my life, for which I cannot find language to adequately express my feelings of appreciation."

The next toast of "The Veterinary Profession" was proposed by the chairman and responded to by Dr. Chas. H. Higgins, of the Lederle Antitoxin Laboratories of New York, and Dr. C. D. McGilvray, Director of the Ontario Veterinary College.

Dr. Higgins took the place of Dr. W. L. Williams, professor of surgery in Cornell University, who was unavoidably absent through illness. The theme running through his remarks was, that we must all so perfect ourselves in our chosen calling that we can render that service to humanity for which our train-

ing best fits us. This is the idealism instilled by Dr. McEachran throughout the entire college course, and it is one which has made it possible for the men from McGill to excel in their respective communities.

Dr. McGilvray paid a very high tribute to Dr. McEachran and the work which he had accomplished in Canada, when the knowledge of disease of animals was just becoming to be an important factor in world commerce and at a time which required a great deal of force to have one's convictions carried into action. He also referred to the task which now confronted him in educating the youth coming as students, in the new teachings, and in this the changed conditions which necessitated the removal of the school over which he presided from city to country surroundings, for the purpose of securing adequate clinical material for a continuance of the practical teaching which is so necessary.

The toast of "The Graduates" was proposed by Dr. M. C. Baker, of Montreal, the oldest professor of the school. Dr. Baker referred very feelingly to the part which Dr. McEachran had played in his guidance. An association of forty years in active business partnership had presented traits of character that a shorter and less intimate association would never have revealed. During this time there had never been any but the very best of feeling between them and at no time had there been a serious difference of opinion to mar the smoothness of their relationships. Dr. Baker, next to McEachran was father to us all, as it was he who guided the trembling footsteps of those being initiated into the mysteries of Comparative Anatomy. Dr. Lamb, of Denver, Colo., replied in his usual scholarly manner and with a great deal of force. He pointed with pride to the standing of the school and was particularly gratified at the return of so many to do honor to our worthy preceptor and Dean.

Dr. Robinson, of Washington, gave many reminiscences of the older days and some of the struggles necessitated by the changes that have taken place in the teaching of comparative medicine during the past decade.

A guest representing the only school in the Province of Quebec and the only school of comparative medicine in which the teaching is conducted in the French language on this

continent was Dr Daubigny, Dean of Ecole Vétérinaire of Laval University, who gave in his native language a very high tribute to Dr. McEachran. He cited him as a pioneer, not only in the province, but in Canada and on the whole American Continent.

It was late when the gathering dispersed, and all were unanimous that the sacrifice was worthy of the opportunity to pay a tribute to such an outstanding personality and professional man as Dr. Duncan McEachran.

CHAS. H. HIGGINS.

AN ENDURANCE TEST FOR HORSES

The third 300-mile endurance contest, conducted under the supervision of a board of sponsors representing several organizations interested in the development of the best type of cavalry horse, was finished October 14 at the foot of the Washington Monument, in the District of Columbia. Of 17 horses starting in the race 5 days before at Camp Alfred Vail, N. J., only 6 were able to finish. In judging the horses, time counted 40 per cent and the condition of the horse 60 per cent.

The winner of the race was the purebred Arab, Crabbet, owned by W. R. Brown, of Berlin, N. H., president of the American Arab Horse Association. Crabbet is 11 years old and weighs 925 pounds. He won with a total score on condition and speed of 84 7/45. Vagrant, a Thoroughbred entered by the U. S. Army Remount Service, 6 years old, and weighing 1,000 pounds, was placed second with a score of 83 7/9. Rustem Bey, a 10-year-old Arab-Standardbred cross, weighing 1,005 pounds, was third, scoring 75 8/9.

Castor, a purebred Morgan, entered by the U. S. Morgan Horse Farm, Middlebury, Vt., won fourth place with a score of 72 2/9. This horse weighed only 800 pounds, and is 11 years old. He carried 245 pounds, the standard load for all the contestants, which was nearly one-third of his weight. This is the third successive year he has finished the endurance test. He has been used for all sorts of work, including farm work, mount for a forest ranger and helping to draw the carriage of the Secretary of Agriculture in Washington. Fifth place was taken by Pathfinder, a Thoroughbred owned by the Remount Service, with a score of 62 2/3. He is 5 years old, the youngest of the

entries, and weighs 910 pounds. Cragmore, a Thoroughbred-Standardbred cross, owned by W. R. Brown, the owner of Crabbet and Rustem Bey, took sixth place with a rating of 61 7/45. He is a 7-year-old, weighing 1,100 pounds.

The judges who made the decisions in the contest were Maj. Henry Leonard, Colorado Springs, Colo.; Harry McNair, Chicago; and Garner West, Garnersville, N. Y. The prizes were put up by W. R. Brown, of Berlin, N. H., and Albert W. Harris, of Chicago. The first prize was $600 and a silver loving cup. The other prizes ranged from $400 to $100.

In presenting the loving cup to the winning horse's owner, who was largely responsible for inaugurating the endurance contest, Secretary of War Weeks said: "What you are doing to develop horses of speed and endurance is not only a benefit to the Army but should be useful to the country as a whole in other ways."

This endurance test was the most severe since the race was inaugurated, as the journey was over roads that could scarcely be called ideal for the purpose. In most cases of those that fell by the wayside the direct cause was inflammation of the tendons, as any sign of lameness was a signal for withdrawal.

If the test results in the stimulation of interest in good saddle horses possessed of stamina and hardiness and with the necessary quality to render them desirable for the mounted service of the Army, and if it should help to determine what breed or blood will produce a mount which will satisfy the many exacting demands on a charger, the sponsors for the race will feel amply repaid.

A MOUNTAIN TRIP

Following the A. V. M. A. meeting at Denver, Mrs. Mayo and I took a delightful, but altogether too short, vacation in Estes Park. It had been many years since we had enjoyed a real outing in the Rockies, and we felt as if we had shed several years years when we got into the "hills" again.

We left Denver in one of the fine busses of the Rocky Mountain Transportation Company, and were particularly fortunate to have two good sports, Dr. and Mrs. Marsteller of Texas, for company. Mrs. Marsteller was puzzled why some other passenger guessed she was from the South, and inquired in her de-

lightful southern accent, "how you all guessed that?" Going up the Big Thompson the wind whisked Dr. Marsteller's cap away and dropped it on a rock in the edge of the river, and he made no embarrassing remarks but got it back all right.

The weather in the mountains was delightful and the scenery magnificent. The aspens were turning to orange and gold on the mountainsides, amid the dark green of the pine and spruce. We took a number of delightful trips in the park before Dr. and Mrs. Marsteller had to return.

After a few days we took the "circle trip" over the divide to Grand Lake. On our way down the western slope to "Squeaky Bob's" ranch we saw two mountain ewes, each with a lamb two-thirds grown. The driver gave a whoop and they went bounding away down the ravine as if on springs.

At Grand Lake we took a motor boat trip around the lake with several college boys who had been driving sight-seeing busses for the transportation company during the tourist season. These boys began asking the motor boat driver some of the questions they had been accumulating during the season. "Oh, driver, I want the top up." "Oh, driver, don't get too near the edge." "Oh, driver, how many people have been killed here?" "Oh, driver, how wide is 'timber line'?" etc.

Grand Lake is a gem set high in the mountains. From its mirror surface the green and gold of the mountainsides were reflected with the deep blue of the clear skies, a scene one will long remember. From the hotel at Grand Lake one could see the mountains about Leadville, one hundred miles to the south, and from the mountain above the hotel, the Medicine Bow range in Wyoming was visible.

The lodge at Grand Lake has sleeping cabins for its guests. We wondered at the big pile of blankets when we went to bed, but we knew their use before morning, for there was a heavy frost and I didn't dawdle getting my clothes on in the morning and making a 100-yard dash for the big open fire in the dining room, and buckwheat cakes and bacon. They make an entirely different and much better kind up in the mountains.

From Grand Lake we came back over Berthoud Pass and down Clear Creek Canyon to Denver, and then back to the city we call home, with its dirt and smoke that does not shut out the fresh air, bright skies and glorious scenery of Colorado.

N. S. MAYO.

TUBERCULIN TEST BY THE AREA PLAN

The "area plan" of eradicating tuberculosis of livestock is now well established in many States. By this plan an area of considerable size, generally a county, is freed from tuberculosis by the systematic testing of all cattle and the removal of reactors. It has been accepted by the livestock owners, as they evidently believe the plan is a practicable one. The work can be conducted in a much shorter time and at less expense than the accredited-herd work. Then, too, it means the suppression of the disease among all the herds in a given area, in contrast with accrediting herds here and there which may be in close proximity to infected herds on adjacent farms.

As a demonstration of the feasibility of tuberculin testing of all the herds within a county, no better example can be given than the work done in Wahkiakum County, Wash., during July and August, 1921. The work started in that county August 3 and was completed September 9. Every herd in the county with the exception of two was tested by Dr. L. V. Hardy.

One of the two herds not tested consisted of only two animals. This owner desired to have a test applied but was unable to catch the animals, which were running in a large pasture and were very wild. The other owner refused to submit to the test until just as the inspector was leaving the county, when he sent word that he desired that the test be applied.

The work was carried on principally in cooperation with the farm bureau members. They furnished conveyance whenever there was a member who owned an automobile. The county appropriated funds to pay operating expenses of the automobiles, and also to hire conveyances when necessary. Farm bureau members cooperated so well that not a single day's time was lost on account of transportation. When it is considered that the work was done without any compulsory laws or regulations, and was wholly a voluntary proceeding, it is felt that the county test was extraordinarily complete.

The actual number of herds tested was 367, comprising 4,039 cattle. The test revealed 58 tuberculous animals which were confined to 12 herds, making the total of 3½ per cent of infected herds and 1½ per cent of infected cattle. Post mortem examination of the 58 reactors revealed 100 per cent lesions of the disease. The actual test was completed at an expense of a little

less than 18 cents per head, including $100 appropriated by the county and a pro rata share of the overhead expense of the bureau office in the State of Washington. It is planned to have an inspector return to Wahkiakum County about November 15 to retest herds that were found infected, and, if possible, to test the two remaining herds.

TREATMENT FOR TAPEWORMS IN DOGS

Dogs are the primary hosts for a number of species of cestodes among the more important of which may be mentioned:

Taenia pisiformis (*T. serrata*), the intermediate stage of which is the *Cysticercus pisiformis* found in the rabbit. *Taenia hydatigena* (*T. marginata*), the intermediate stage of which is the *Cysticercus tenuicollis* found in sheep, cattle and hogs. *Dipylidium caninum* (*T. cucumerina*), the intermediate stage of which is known as a *Cryptocystis* and is found in the dog-flea and louse. *Multiceps multiceps* (*T. coenurus*), the intermediate stage of which is the *M. multiceps* (*Coenurus cerebralis*), found in the brain of sheep. *Echinococcus granulosus* (*T. echinococcus*), the intermediate stage of which is *E. granulosus* found in sheep, hogs, cattle, other animals and man. *Taenia ovis*, the intermediate stage of which is *Cysticercus ovis* found in sheep.

The presence of tapeworms is ascertained by a microscopic examination of the feces for the presence of eggs, by giving enemas for dislodging segments and by seeing the segments pass in the feces. The segments of *Echinococcus granulosus* are not readily seen in the feces on account of their small size. This parasite is the most important one from a public health aspect on account of the fact that the eggs when ingested by man develop into the intermediate stage in the human body. The development of the large *E. granulosus* cysts in human beings frequently results in the death of the infected individual. Fortunately, it is extremely rare in this section of the country and I do not remember ever having seen this variety of tapeworm in the dog.

Many drugs have been recommended in the treatment of animals infested with these parasites, but none act so quickly and seem to possess such a specific action against them in the dog as arecoline hydrobromide. The drug is given by the mouth in tablet form on an empty stomach. One-fourth of a grain may be given to medium-sized dogs, and one-eighth of a grain to the small

breeds. It acts on the bowels in from 20 minutes to one-half hour and the parasites are passed with the feces. A single treatment seems to remove all the parasites including the heads. In one case 168 complete tapeworms were passed following a single administration of one-fourth grain of the drug. It is of advantage to follow the arecoline treatment after the worms have been passed with 10 to 15 drops of camphorated tincture of opium (paregoric) in a dram of essence of pepsin to quiet down the excessive peristaltic action caused by the arecoline.—WILLIAM J. LENTZ *in University of Pennsylvania Bulletin, Veterinary Extension Quarterly, No. 3, page 2.*

PAY YOUR DUES

If your JOURNAL stops, it is quite likely that your dues for the current year have not been paid to the Secretary of the A. V. M. A. Therefore, before writing to the Editor making complaint or asking why the JOURNAL failed to reach you, it might be well to make sure that your dues are paid up to date. If they are not paid, notice has been mailed to you by the Secretary calling attention to this fact. One of the requirements of the Post Office Department is that all papers and publications may be sent only to those fully paid up, therefore when a member fails to respond to calls from the Secretary the Editor is notified to remove that member's name from the list as delinquent in payment of dues. A certain share of the dues paid by each member is sent to the JOURNAL, and if the members do not keep their dues paid up it simply means that others must carry the burden of financing the paper and the Association.

Dr. A. C. Knapp, one of the alumni of the New York State Veterinary College at New York City, Bridgeport, Connecticut, has been seriously ill. In a letter from Mrs. Josephine L. Knapp, she states he has been suffering from gastric ulcer and became so weakened from hemorrhages that the doctors were obliged to make a blood transfusion. He is now greatly improved but will have to remain in bed for some time to come. Dr. Knapp has been connected with the Bridgeport Board of Health for the past fifteen years.

SCHOOL CHILDREN IN TEST ON CATTLE TICK

With 30 questions to answer in 20 minutes, ten children from the Jackson, La., school, waded into the written examination on "The Cattle Tick Fever," and showed State Superintendent T. H. Harris and the whole teachers' institute just how few terrors the ordeal had for them. Nearly every one of the ten scored above 90 and not one of them was far below the mark.

Dr. W. L. Coplin and Dr. L. D. Nowell, of Humboldt, Tenn., have formed a joint partnership and are conducting two veterinary Hospitals.

Dr. Coplin is stationed at Jackson, Tenn., and Dr. Nowell at Humboldt.

They both report practice conditions favorable.

Dr. John A. Phillips, who has been connected with the city health department of Birmingham, Ala., for some time, has tendered his resignation and will leave for Houston, Texas. Dr. Phillips has accepted a place with the Houston Clinical Laboratory.

Dr. John P. O'Connor, formerly engaged in practice in Oklahoma, has been reinstated in the U. S. Bureau of Animal Industry service and assigned to hog cholera control work in Tennessee. His headquarters are at Nashville.

Dr. R. E. Shigley, of Kenmore, N. D., President of the State Board of Veterinary Medical Examiners, spent several days recently at New Rockford, N. D., in attending the funeral of Dr. C. H. Babcock.

Dr. Alfred Savage, who was connected with the MacDonald College of Quebec, has accepted the position as professor of animal pathology of the Manitoba Agricultural College, Winnipeg, Manitoba.

Dr. W. D. Mason, Cincinnati Veterinary College, 1914, has located for practice at Winchester, Franklin County, Tenn.

Dr. J. I. Siress, Terre Haute Veterinary College, 1912, has located for practice at Chattanooga, Tenn.